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THE
SPORTSMAN'S
HAND BOOK

CONTAINING
RULES, TABLES OF WEIGHTS AND MEASURES,

CONCISE INSTRUCTIONS ON

*Selecting, Caring for and Handling Guns and Fishing Tackle;
Dog Breaking; Shooting on the Wing; Hunting Large
Game; Camping Out and Camp Cooking; Miscella-
neous Recipes; How to Skin and Prepare Bird
and Animal Skins for Specimens; and Many
Other Hints and Instructions Use-
ful to Beginners.*

BY

COL. HORACE PARK.

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ROBERT CLARKE & CO.
1886.

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COL. HORACE PARK,
1885.

PREFACE.

Better to hunt in fields for health unbought,
Than fee the doctor for a nauseous draught,
The wise for cure on exercise depend;
God never made his work for man to mend.

—*Dryden.*

This, on the face of it, is a book of reference and suggestions for the beginner. It is written for the young sportsman, not the old and experienced. Its object is not to advance new theories by excursions to debatable grounds, but to present the results of actual experiments, as well as facts established by more than thirty years' experience, together with admitted truths, all in a plain form. Details may appear somewhat dull, but clearness can not be accomplished by any other method.

The typographical arrangement of the book may appear somewhat fragmentary and broken. I have drawn from scientific reports, and have quoted the results of the experiments of reliable men and authors, for which due credit has been given.

The tables of weights and measures, etc., will certainly be appreciated for reference. I believe the careful reader will find the subject throughout, brought up to the latest clearly ascertained results, while in some directions a positive advance has been made.

HORACE PARK.

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12 UNITED STATES MEASURES AND WEIGHTS, ACCORDING TO AN ACT OF
CONGRESS, 1866.

MEASURES OF LENGTH.

Dimensions.	Values.	Equivalents in Use.
Myriameter.....	10000 meters.	6.2137 miles.
Kilometer.....	1000 meters.	.62137 mile.
Hectometer.....	100 meters.	328 feet and 1 inch.
Dekameter.....	10 meters.	39.37 inches.
Meter.....	1 meter.	39.37 inches.
Decimeter.....	$\frac{1}{10}$ of a meter.	3.937 inches.
Centimeter.....	$\frac{1}{100}$ of a meter.	.3937 inch.
Millimeter.....	$\frac{1}{1000}$ of a meter.	.0394 inch.

MEASURES OF SURFACE.

Denominations and Values.		Equivalents in Use.
Hectare.	10000 square meters.	2,471 acres.
Are.....	100 square meters.	119.6 square yards.
Centare.....	1 square meter.	1550 square inches.

MEASURES OF VOLUME.

Denominations and Values.			Equivalents in Use.	
Names.	No. of Liters.	Cubic Measure.	Dry Measure.	Liquid or Wine Measure.
Kiloliter or Stere.	1000	1 cubic meter.	1.308 cubic yds.	264.17 gallons.
Hectoliter	100	$\frac{1}{10}$ cubic meter.	2 bu. & 3.35 <i>pecks</i>	26.417 gallons.
Dekaliter	10	10 cubic decimeters.	9.08 quarts.	2.6417 gallons.
Liter.....	1	1 cubic decimeter.	.908 quart	1.0567 quarts.
Deciliter.....	$\frac{1}{10}$	$\frac{1}{10}$ cubic decimeter.	6.1022 cubic inches.	.845 gill.
Centiliter	$\frac{1}{100}$	10 cubic centimeters.	.6022 cubic inch.	.338 fluid oz.
Milliliter.....	$\frac{1}{1000}$	1 cubic centimeter.	.061 cubic inch.	27 fluid drms.

WEIGHTS.

Denominations and Values.			Equivalents in Use.	
Names.	No. of Grams.	Weight of Volume of Water at its Maximum Density.	Avoirdupois Weight.	
Millier or Tonneau.....	1000000	1 cubic meter.	2204.6	pounds.
Quintal.....	100000	1 Hectroliter.	220.46	pounds.
Myriagram.....	10000	10 Liters.	22.046	pounds.
Kilogram or Kilo.....	1000	1 Liter.	2.2046	pounds.
Hectogram	100	1 Deciliter.	3.5274	ounces.
Dekagram.....	10	10 cubic centimeters.	.3527	ounce.
Gram.....	1	1 cubic centimeter.	15.432	grains.
Decigram.....	$\frac{1}{10}$	$\frac{1}{10}$ of a cubic centimeter.	1.5432	grains.
Centigram.....	$\frac{1}{100}$	10 cubic millimeters.	.1543	grain.
Milligram.....	$\frac{1}{1000}$	1 cubic millimeter.	.0154	grain.

For measuring surfaces the square Dekameter is used under the term ARC; the Hectare or 100 ares is equal to about 2 acres.

The unit of capacity is the cubic decimeter or LITER, and the series of measures is formed in the same way as in the case of the table of lengths.

The cubic meter is the unit of measure for solid bodies, and is termed STERE.

The unit of weight is the GRAMME, which is the weight of one cubic centimeter of pure water weighed in a vacuum at the temperature of 4° Centigrade or 39°.2 Fahrenheit, which is about the temperature of maximum density.

In practice, the term cubic centimeter abbreviated C. C., is used instead of milliliter, and cubic meter instead of kilolitre.



MEASURES OF WEIGHT.

The standard avoirdupois pound is the weight of 27.7015 cubic inches of distilled water weighed in air at 39°.83, the barometer at 30 inches.

A cubic inch of water weighs 252.6937 grains.

AVOIRDUPOIS.

16 drachms.....	1 ounce.	Drachms.	Ounces.	Pounds.
16 ounces.....	1 pound.	256
112 pounds.....	1 cwt.	28672	1792
20 cwt.....	1 ton.	573440	35840	2240
1 pound=14 oz. 11 pwts. 16 grs. troy, or 7000 grains.				
1 ounce=18 dwts, 5.5 grains troy or 437.5 grains.				

TROY.

24 grains.....	1 dwt.	Grains.	Dwt.
20 dwt.....	1 ounce.	480
12 ounces.....	1 pound.	5760	240

7000	troy grains.....	1 lb. avoirdupois.
437.5	troy grains.....	1 oz. “
175	troy pounds,.....	144 lbs “
175	troy ounces.....	192 oz. “
1	troy pound.....	822857 lb. “
1	avoirdupois pound.....	1.21578 lbs. troy.

APOTHECARIES.

20 grains.....	1 scruple.
3 scruples.....	1 drachm.
8 drachms.....	1 ounce.
12 ounces.....	1 pound.
45 drops.....	1 teaspoonful or a fluid drachm.
2 tablespoonfuls.....	1 ounce.

The pounds ounce and grain are the same as in troy weight.

Gunpowder.—The following table shows the composition of the different gunpowders:

Mills.	Niter.	Charcoal.	Salt peter.
Royal Waltham Aboy..	7500	1500	1000
France National Mills ..	7500	1250	1250
French Sporting.....	7800	1200	1000
French Mining	6500	1500	2000
U. S. A	7500	1250	1250
Prussia.....	7500	1350	1150
Russia.....	7300	1350	1263
Austria (musket).....	7200	1700	1600
Spanish.....	7647	1078	1275
Sweden.....	7600	1500	900
Switzerland.....	7600	1400	1000
China.....	7500	1440	990
Theoretical Powder.....	7500	1323	1177

Gunpowder is distinguished as *musket*, *mortar*, *cannon*, *mammoth* and *sporting*.

Number of cartridges one pound of powder will load:								
with	5	drachms	1	pound	will	load	51	shell
"	4	"	"	"	"	"	64	"
"	3½	"	"	"	"	"	73	"
"	3	"	"	"	"	"	85	"
"	2½	"	"	"	"	"	102	"
"	2	"	"	"	"	"	128	"

SHOT.

with	1	ounce	1	pound	will	load	16	shell
"	1⅛	"	"	"	"	"	14 x	"
"	1¼	"	"	"	"	"	12 x	"
"	1⅓	"	"	"	"	"	11 x	"
"	1½	"	"	"	"	"	10 x	"
"	1⅝	"	"	"	"	"	9 x	"
"	1¾	"	"	"	"	"	9	"
"	2	"	"	"	"	"	8	"

Number of shot pellets each size in one ounce:

	Leroy's.	Tatham's.	Chicago.	English.
No. 10	822	848	850	1700
" 9	560	563	596	1000
" 8	375	399	434	605
" 7	278	291	323	350
" 6	209	218	216	270
" 5	149	168	172	220
" 4	121	132	146	180
" 3	98	106	118	130
" 2	82	86	92	110
" 1	60	71	75	80

Percussion caps are numbered from 5 to 14. The sizes run with the numbers from 5 small to 14 large. Larger than 14 are musket. There is no standard size to the grain of powder. Each mill make their own sized grains. When numbered they usually run from 1 fine to 6 coarse. When lettered, from extra fine, Fg, IFg to IIFg coarse.

For shotguns No. 3 or FFg gives the highest velocity and best penetration, with the same amount. The recoil is slightly greater than coarser.

Restoring Unserviceable Powder.—When powder has been damaged by being stored in damp places, it loses its strength and requires to be worked over. If the quantity of water absorbed does not exceed 7 per cent. it is sufficient, if it is dried, to restore it to service. This is done by exposing it to the sun.

When powder has absorbed more than 7 per cent. of water it is worthless, unless worked over at some powder mill.

SHELL PRIMERS.

From the fact that there is quite a number of different sizes and kinds of primers, it is well to remember the number or name on the box to avoid confusion when purchasing. A great many men go to a gun-store and inquire for Primers for No. 12 shell, or No. 10 shell. The size of the shell has nothing to do with the size or kind of primer. All that is necessary is to remember the name of the primers on the box you have used.

LIST OF THE DIFFERENT PRIMERS.

No. 0 PRIMERS—COPPER.

For S. & W., and Colt's S. A. & D. A. 32, 38, 41, and other small caliber pistols, using central fire ammunition.

No. 1 PRIMERS—COPPER.

For 44 M. & H., 44 Webley, 44 Bulldog, 45 S. & W., and 45 Webley pistol cartridges; 32, 38, and 44 Winchester, Ballard, Wesson's and Colt's rifle cartridges.

No. 1½ PRIMERS—BRASS,

Are the same size as No. 1, but less sensitive; will fit same shell as No. 1, and are better for guns with very strong mainsprings, as they are harder and the plunger will not cut through.

No. 2 PRIMERS—COPPER.

For paper and metallic shot shells, 44 Russian, 44 and 45 Colt's pistols, and other shells using No. 2 primers.

No. 2½ PRIMERS—BRASS.

Diameter and depth same as No. 2, but less sensitive; used usually in military cartridges, but will fit same as No. 2. Better for guns with very strong mainsprings.

The following primers are known by name as well as number. All others, whether by the same maker or not, the same numbers are the same size:

Berdan No. 1, military cartridges.

Berdan No. 1 $\frac{1}{2}$ same size of No. 1—but more sensitive—for brass shot shell.

Berdan No. 2 for brass shot shell.

Orcutt for old style paper shot shell.

Breech-loading shell caps, or percussion primers, are for Sturtevant brass shot shell.

NOTE—Berdan primers can be used only on shell especially made for them.



FIRE-ARMS.

It is now a little over four hundred years since fire-arms were first invented, and from the period of their first inception to the present time money has been expended to almost an unlimited degree, and the brains of many, many men, have been racked in perfecting the crude results of first experiments and in bringing before the public at the present time the high degree of attainment wrought in their perfection as found in the hammerless breech-loading shot-guns of to-day.

About the first gun that we have any account of was called the "Bombard," which dates back to about the year 1450. This gun was an unwieldy, uncouth mass of iron, weighing eighty pounds or over, and was fired by using a lighted stick. The first shoulder gun, or a gun with a stock, called an "Arquebus," was brought into notice about the year 1468. This was a very awkward arm, and could not be introduced in nor used by the armies of that period, as they were exceedingly heavy, requiring several men to handle them, and were of little practical use—they were able to fire it but about eight times in twenty-four hours by hard work—the soldiers at that time much preferring their bows and arrows or cross-bows, and their cumbersome stone-throwing catapult. The next step forward was the invention and attempted introduction of an improvement by the addition of a contrivance called a wheel lock, at Nuremberg, in 1630, answering the purposes of ignition, for which it was intended, very poorly. This gave way to the flint lock, which, in its perfected form, was used by our forefathers who "fit in the Revolution."

The greatest stride of progress towards making a fire-arm practical (with due respect to our ancient flint lock) was the invention of the percussion cap, in 1818.

Few realize the wonderful progress made in the last few years in fire-arms. For a moment look back but a short time at the arms used by the Boys in the field, and compare them with the present. Think of the roll of paper filled with powder and ball, and the necessity of biting off the end of the paper before turning the powder in the muzzle of the barrel, then ramming down the ball, and finally putting on a cap, and compare it with the quick movement of simply inserting a shell, all ready to be discharged, in the breech of the gun, as at present, and you will then realize the degree of improvement that has been brought forward.

The most recent invention is a gun without visible hammers. The appearance is very handsome, though somewhat peculiar looking, owing to the absence of hammers where we are accustomed to see them, but familiarity will soon overcome whatever little objection this may raise in the mind of anyone. The hammers proper are arranged in a very substantial and at the same time simple manner, on the inside of the stock, corresponding to the location of the locks on guns in general use. They are so constructed that throwing up the barrels for the purpose of introducing a shell, cocks both barrels, at the same time shifts an automatic safety catch into a position firmly locking the triggers, rendering the gun safe from an accidental discharge. The safety catch is situated on the grip near the position of the thumb. Before the gun can be discharged the safety catch must be shoved a little forward, which is easily done by a slight motion of the thumb; then the gun is discharged like other guns, by simply pulling the triggers. The hammerless gun is fast gaining favor with many sportsmen, but at present they range at too high prices to come within the means of the masses.

Although it is difficult to see where there can be more room for improvement in fire-arms, or breech-loading shot-guns in particular, still time will tell, and the rapid strides that have been made in the last few years leads to the belief that "the end is not yet."

GUN BARRELS.

There is no part of a gun, except the barrel, but what can be made by hand by any really first-class gunsmith. Gun barrels are made at regular factories by mechanics called barrel-makers. A very clear idea can be had from the following paper published in the *Scientific American* May 11, 1872. It is copied in full and will be found quite interesting, as so little is known by the masses concerning the manner, or the material used in their manufacture:

BIRMINGHAM GUN MAKERS' AND INVENTORS' CLUB.

At a recent meeting of the above club, according to the *Mechanics' Magazine*, Mr. Samuel Smith, of Weaman street, Birmingham, gun barrel maker, read a paper on the manufacture of gun barrels, of which the following is an abstract:

The material used for gun barrels was mostly charcoal iron. For plain and figured barrels, at the date of which I am speaking—namely, 1793—the iron used was stub, stub twist, wire twist, and Damascus. Stub twist was first made as plain stub, but, instead of being hammered into a “skelp” or flat plate, it was drawn into a strip, coiled around a mandrel, and welded in the usual way. Stub twist is now made of old horseshoe nails and steel cuttings, about two inches long, one-quarter inch in breadth, and the same in thickness. The two are mixed up together and “balled” in a furnace, and the bloom drawn out under the forge hammer. It is then rolled into a strip, coiled round a mandrel, and welded as before. If the balls are very large, or the stubs or steel of inferior quality, the iron will not be good. Plain stub barrels were made of the same iron, forged into a skelp, and welded longitudinally.

Damascus and wire twist are now made by "piling" plates of iron and steel alternately. The plates are about three inches broad and a quarter of an inch thick. From sixteen to twenty are piled on top of each other; they are then placed in a furnace and raised to a welding heat, drawn down under a forge hammer, and rolled into square rods, 3-8, 7-16, 1-2 and 9-16-inch, according to the size of the barrels required. The wire twist is rolled so as to show the edges of the different plates on the flat of the strip, so that when it is welded together it looks like a coil of wire from one end of the barrel to the other. The Damascus is rolled into square rods; these are cut into suitable lengths, heated white hot, and twisted until they become round like a screw. Two or three of these are welded together, and then rolled down to rods of the size required. These are then coiled round a mandrel and welded in the usual way.

There is another iron, called silver steel. It was first made about forty years ago, I believe, by Mr. Whitehouse, of Wednesbury, by laminating Swedish iron and steel, like Damascus, but not with so many layers. It is very good. The figure is not much better than the iron that is now called single iron Damascus, but it was a very strong iron. The silver steel that is now made is rolled into a square of 7-16 inch, and worked like Damascus. Two rods are welded together and rolled down to the size required, and welded in the same way as other twisted barrels. This iron is now made both at Adams' and J. Clive's. There is not so much used as formerly.

About forty-five years ago J. Clive began to make iron for gun barrels, and the best iron is now made by Mr. G. Adams and J. Clive, who may be said to be indeed the only makers of "best twist" gun iron. The iron now in use is of six qualities—1st, skelp twist, price 2d. per lb.; 2d, iron twist, 3d. per lb.; 3d, fourpenny stub, 4d. per lb.;

4th, fivepenny stub, 5d. per lb.; 5th, silver steel, 7d. per lb.; 6th, Damascus, 7d. per lb. No. 2 is twisted into a screw, like Damascus, and is called iron Damascus. This is worked in single rod and double rod—that is, two rods put together and rolled into a strip. The same is done with fourpenny and fivepenny stub, and the result is called stub Damascus, but the cheap guns are chiefly made of the iron Damascus. This is the cheapest figured iron. It contains no steel, being generally made of waste screws mixed with other scrap. It requires experience to distinguish it from the true steel Damascus.

Welding: Best barrels are welded by coiling the strip round a mandrel, and then heating it to a welding heat in a smith's fire; it is then taken out and jumped up on an iron plate on the floor, then put in a swage with a "stamp" or mandrel inside, and hammered down. About three inches are welded at a time. Here I may observe that there are very few welders who use the "stamp" except for a few inches at each end; but best barrels ought to be welded on a stamp throughout.

History of gun iron: Mr. R. Adams began to make twist iron about the year 1815. He was before that time a tilter of barrel skelps or plates for making plain iron barrels. At that time a great deal of iron was made from swaff or flings, which were first washed and then mixed with scrap, made into a ball, and welded in a smith's forge; this was called "swaff ball drawing." It made very good iron, and was used by lock forgers, breech forgers, and occasionally made into barrels for fowling pieces. In the early time of the barrel trade, there were a number of small forges for making barrel skelps by tilting; one in particular was at Wednesbury Bridge, and here Mr. R. Adams, above mentioned, worked; and there is no doubt he saw what the trade required. At the close of the French war he began

to make twist iron as a trade. Before this time it had been made at various forges, but no one made a specialty of this kind of iron. Mr. Adams continued working at Wednesbury till unfortunately killed by the bursting of a boiler, after which Mr. G. Adams took up the business and continues to make twist gun iron at his new works, in Church Lane, West Bromwich, up to the present day.

Boring: After the barrels are welded, they go to the mill. They are first rough bored. This is done by fastening them in a socket or holder; the "bit" is a square steel "rimer," of suitable length, running at about 500 revolutions per minute, which is forced through the barrel. The fine borer then examines the barrel, "sets" or straightens it, and then it is "spilled up," a process the same as rough boring, except that the bit does not cut on all the edges; it has a "spill," or piece of oak wood, put on one side, which causes it to cut much more evenly. The workman then "sets" the barrel and finishes the boring, which is done at a speed of seventy to eighty revolutions per minute. The bit only cuts on one edge, which is left sharp, and a deal spill is used, packed up with strips of paper as the boring proceeds. The barrel is examined and "set" several times during the operation. The setting is done by the shade or reflection, down the inside of the barrel, from the top of the window.

It is an art that can only be acquired by long practice and perseverance. Some men have worked at the trade all their lives, and have never learned to set a barrel correctly. The same process is used for sporting and military barrels up to the fine boring. After fine boring, the military barrels are turned, or stripped as it is called, which is done by a self-acting slide lathe, which takes off the thick side, if they have any. The grinder then finishes them to the gage. The history of boring and setting I cannot attempt to state;

but setting, I think, does not go back much more than one hundred years. My father began to work as a fine borer in the year 1793. Setting was known then, but not generally. He had to pay for the secret. According to my father, a man named P. Parsons was the first to set barrels that he had heard of. He worked at Duddleston Mill, being what was called a "best workman" at sporting barrels. This Mr. Parsons used at first, for the purpose of setting, a string or wire which was drawn tight by a bow, or otherwise, and applied to the inside of the barrel. By this means he discovered the crooks, and then corrected them with a hammer. The process of fine boring is the same now as it was in 1793; that is, it is done with a square bit, but only two edges cut, and only one at a time. The advantage of taking off the edges was said to be discovered about 1790, by Mr. Beesley, and this was kept a secret among good workmen for a long time. I think we may be sure that boring and setting had not attained their present perfection until the beginning of the present century.

In the year 1787 there were twenty-seven gun-makers in Birmingham, and barrels were made, bored and ground at water mills all round the town. Such mills still exist, chiefly in the neighborhood of Hales Owen, where large numbers of barrels are now made. I have not touched on the subject of rolled barrels, which are chiefly used for military fire-arms and the commoner sort of sporting guns. The rolling of barrels from short taper skelps, a foot or more in length, is comparatively a recent process. The barrel is drawn over an oval headed mandrel, so fixed that its head is immediately between the grooves of the upper and under roll. These grooves are of a shape corresponding to the outline of the barrel. Of late years, steel barrels have come very much into use for rifles, but to a very small extent for sporting guns as well, the want of "figure" operating much

against them. Steel rifle barrels are sometimes drilled out of a solid bar, which must be "set" from time to time, as the drill is certain to run out. As there is usually more to turn off one side, they are generally of unequal hardness, and is a difficult matter to keep them straight. Steel barrels are now usually rolled from twelve to fifteen-inch drilled blanks, the hole in which is much larger than the intended bore. The punching of shorter blanks, which were afterwards rolled out into a barrel by two rollings, constituting the patent of Deakin and Johnson, appears now to be discontinued, though very good barrels were made by the process."

The reading of Mr. Smith's paper was accompanied by practical illustrations of the method "shading" barrels, or detecting internal or external irregularities. Barrels, straight and bent, were supported at each end, and Mr. Smith explained the entire process, which has been kept very much as a secret by the very few who really understand it. So delicate is this test that the distortion, produced by warming one side of the barrel with a common candle, was distinctly perceptible. Independently of its practical utility, the "shading" of a gun barrel is an exceedingly interesting optical problem, which has never yet been investigated.



BRASS AND PAPER SHOT SHELL.

The question which gives the best results, brass or paper shell, is a disputed one; both have firm advocates. This is especially referred to in another place. Brass shell as well as paper, using No. 2 primers, are best. No. 2 primers are fitted with a piece of nicked brass, inside the primer, called the anvil. This anvil receives the blow from the plunger, thus protecting the shell from being damaged from repeated blows of the plunger, these being renewed every time the shells are recapped.

Great care must be used in loading shell to insure uniformity. The powder and shot measure should be "struck" off every time. The best arrangement for loading shell, paper, or brass, is a tool called the "Barclay loader," which consists of a brass tube just fitting the outside of the shell. The loading tube is double at the upper end; the inside tube is split in four places, making a kind of a spring. When a shell is inserted for loading the inside tube enters the inside of the shell, which guide the wads smoothly into the shell. In reloading shell, be sure to recap before attempting to reload; don't attempt to uncap or recap a loaded shell. With this loading tube there is a rammer and a loading block; this block is counter-bored to fit the head of the shell. There is also a hole entirely through the center of the block to insure safety from explosions of the primer while ramming in the wads. One objection to the use of brass shells is the tendency to expand by use, rendering them tight in the gun-chamber, and hard to extract. This can be almost entirely avoided by using light charges of powder in new shell for three or four times and keeping the shell well oiled on the outside. The oil acts as a kind of a cushion, and light charges expands the shell gradually to fit the chamber of the gun.

Brass shell, as a rule, can be used in only one gun, from the fact that guns are not chambered uniformly; even guns of the same make often vary slightly. After brass shell have been used three or four times with light charges, they will stand heavy charges without farther expansion; but don't neglect to oil them outside every time they are reloaded, which can be done by simply wiping them with a rag saturated with oil. The inside of brass shell should never be cleaned, no matter how dirty they become; burnt powder will leave a rough surface inside, which will add materially to holding the wads in place. To clean brass shell it is best to do it before the exploded primers are removed. Plug the end of the shell with a good fitting cork, then wash with soap and water to remove the oil. Then wash in a solution of salt in warm vinegar, rinse off in clear water, and wipe dry. In this way you can clean only one shell at a time, unless you have a number of corks for the end; or, use a preparation called Universal Metal Puts Pomade. This a red paste, put up in tin boxes. By fitting a stick in the shell, with enough remaining outside for a handle, you can, with the pomade and a woolen cloth, make your shell brighter than when new, and in a very short time. This Puts pomade is good for cleaning any kind of metal; good even for the inside of gun barrels, silverware of all kinds, watches, jewelry, etc. It is very fine, and there is no danger of scratching.

Paper shells are loaded in the same way as brass shell, but use wads the same number as the shell; for brass shell wads from one to two sizes larger. To render paper shell secure in handling and carrying in the pocket, the end must be crimped with a tool called crimper, or turn-over. After the paper shells are loaded, to crimp successfully, not more than one-eighth of an inch of the shell should project beyond the top wad. When more than this

projects, with a very sharp knife or shell cutter remove the surplus, then the shell will crimp with a neat, firm bead, giving the end of the shell rather a pretty appearance. For 12 gauge shell $2\frac{1}{2}$ inches, and for 10 gauge shell $2\frac{5}{8}$ inches long will be found to be about right, without cutting off, unless very small charges are used.

As a rule it don't pay to reload paper shell, except the best grades; even then, life is too short to be hunting with pockets filled with empty paper shells, which are too cheap to be worth saving.

The shell chambers of guns should be oiled occasionally. For this purpose, it is quite convenient to carry a pocket oiler in the vest pocket, where it would always be ready for use.

The following letter, written by the author of this book, was published in the *Forest and Stream*, in the year 1884, in connection with the long discussion on the performances of shotguns. It is here reproduced, as it has many hints directly pertinent to the subject:

THE PERFORMANCE OF SHOTGUNS.

In an editorial note, February 21, you truly say that the comparison of muzzle-loaders and the breech-loaders is a dead issue, but a comparison of the shooting qualities of the two guns will certainly bring about just the discussion you suggest: "the relation of experiments and tests in loading to secure pattern and penetration."

My experience in hunting, shooting and experimenting runs back for thirty-five years. It has been with all kinds of guns, from the old Continental flint-lock musket to the best breech-loaders of to-day. I now own three breech-loaders made by myself for the especial purpose of experimenting. One is a single barrel 3-bore, weight 11 pounds, in which I use one-inch Gatling-gun brass shells; no paper shell large enough are made. One is a single 10-bore, 14

pounds, and the third a 20-bore, 11 pounds. I design conducting a series of experiments some time this spring and will give you the results. With all my practical experience I do not claim to be authority, but what I have to say are my own convictions, based on the results of many practical tests, and simply give them as such.

The old saying "as straight as a gun barrel" certainly had no reference to very many of our modern double breech-loaders, for not one in ten has straight barrels. I refer to the inside bore. This is especially true as to the cheaper grades, and I am sorry to say that many of the better grades have the same fault. In order to get the required strength for the breech action as well as to stand heavy charges, breech-loading barrels must be very heavy at the breech end. This necessitates considerable taper in the barrels, or the guns would be very heavy. Nearly all the taper is in the first half of the barrels from the breech end. Very much of the beauty of a gun depends on the graceful sheer given to the taper. In joining at the factory, the barrels are sprung together in the center, in order to have the ribs fit properly, as well as to give the gun a graceful appearance, hence the bore of the barrels are not straight. However, twelve to fifteen inches of the muzzle ends are practically straight, and parallel with the line of sight. It often occurs in the cheaper grades that the barrels are sprung so much in the center that the muzzle ends diverge to the right and left. In such guns the right barrel shoots to the right and the left one to the left. Guns with the barrels tapered down very thin at the muzzle, as a general rule, are better shooters than those with thick ones. A majority of choke-bored guns are too heavy at the muzzle, which accounts for their grouping the shot in bunches and leaving many bare spots in the targets. In very thin guns there is a certain amount of expansion and elasticity, which has the effect to

overcome the tendency to group the shot, hence give quite an even distribution.

It can be put down as an axiom that guns having the straightest barrels, other things being equal, will give the best results.

The next consideration that has much to do with the good and bad shooting is the quality and quantity of the ammunition. There can be no denying the fact that a good quality of ammunition is better than a poor quality; but as to quantity, opinions differ greatly. From some unaccountable cause, there appears to be a general opinion that breech-loaders require very much more powder than the old-styled muzzle-loaders, when, as a matter of fact, guns properly chambered and properly charged require less. In well-constructed breech-loaders there are absolutely no escaping gases unless the plunger cuts through the primer. In muzzle-loaders it quite often occurs that sufficient gas escapes at the nipple to throw the hammer back to a full cock. In guns of ordinary weight, 8 pounds to 8½ pounds, I would not advise 5 drams of powder to 1¼ ounces shot, nor would I think of 1 dram of powder to 13 buckshot. The proportion of powder to shot that gives the best general results will be found to be 3 drams of powder to one ounce of shot. On page 546 of "Haswell" will be found proportions of powder to shot for the following numbers of shot, as determined by experiment:

No.	Shot, oz.	Po'der drams.	No.	Shot, oz.	Po'der drams.	No.	Shot, oz.	Po'der drams.
2	2	1.5	4	1.5	1⅞	6	1.25	2⅜
3	1.75	1.625	5	1.375	2⅛	7	1.125	2⅝

NOTE.—Two ounces of No. 2 shot with 1.5 drams of powder produced the greatest effect. The increase of powder for the greater number of pellets is in consequence of the increased friction of their projection.

With American engineers Haswell, is good authority. How few men from actual knowledge could dispute the results as he has given them; I could not do it, for I have never experimented with 2 ounces of shot to $1\frac{1}{2}$ drams of powder. Ogeecher's 1 dram of powder to 13 buchshot is about according to Haswell. Killing a buck at the distance of 120 yards with such a charge caps the climax. Put me down as a little skeptical. Whoever sticks to the proportion of 3 drams of powder to one ounce of shot will be satisfied with the results.

Now, in regard to wads. Nearly all guns, by actual measurement, are from one to two gauges smaller than they are called. Many chokebore 10s will gauge but 12 at the muzzle. As a general rule, for No. 10 brass shells No. 8 wads are used; for a paper shell, a wad of the same number as the shell. There is also a general opinion that brass shells will give better results than paper shells; but all of my experiments have proven the contrary. Paper shells, loaded with wads same number as shell, and not crimped, will give better results than brass shells loaded with wads two sizes larger than shell. Firm, elastic felt wads are best. The advantage of two wads on the powder is so very little that I have never been able to discover it.

More of the good or bad results of shooting depend on the manner of loading than most shooters are willing to admit. The ordinary way of loading is to use for brass shells wads two or three sizes larger than the gun. The large wads are with some difficulty forced down on to the powder with a close-fitting loading plug, that has either a perfectly flat or a concave end. The inside of brass shells that have been used are very rough, a kind of sandpaper surface. The friction of the large wads is so great that the force of the discharge will bulge the center of the wads forward, and when the wads reach the smaller or true cali-

ber of the gun at the end of the chamber, they will bulge still more in the center—the worst possible condition for good results. The shot will be projected in a circle, and the center of the target will have few, if any, shot in it. The crimping of paper shells has the same effect, but in a much less degree, inasmuch as the wads are smaller.

To remedy this defect in loading, use a loading plug with a convex or cone-shaped end, and for a No. 10 brass shell use a No. 9 or 10 wad on the powder. The wad should be firmly rammed on the powder and lightly on the shot. If two wads are used on powder they should be each rammed separately. The wads will be seated on the powder cuping the best possible shape for good results in shooting and will be less likely to start from the recoil or rough handling. I once made a very poor shooting muzzle-loader a very good one by changing the shape of the butt end of the ramrod. The fault of the gun was that it distributed the shot in a ring. The center of the target for a foot in diameter would be almost entirely free from shot. The butt end of the ramrod was very much concaved, and at that time I used very large wads. I reversed the shape of the end of the rod, made it very much convex or cone-shaped. By using this rod the gun was made an excellent shooter; in fact, it acquired such a reputation that I sold it for more than first cost, after using it for six years.

I have one more experimental way of loading, which I hope all glass-ball shooters, who think two wads are a necessity, will try. Load a few shells without any wad between the powder and shot. Use a flat-ended loading plug. Ram the naked powder quite hard; then put in the shot. On the shot put one good felt wad. Try this on glass balls, from any kind of a trap at the regular distance. Now don't say that charges loaded in this way will not break glass balls until you have tried them. In my experiments I used No. 9 shot.

Overcharges of powder are a detriment to the good shooting of any gun. Shot discharged from the muzzle of a gun is very similar to water discharged from a hose nozzle. A hose nozzle to throw a solid stream to any great distance must be chokebored, very similar to a chokebored gun. There is a limit to the distance that water can be projected by pressure through a nozzle, and an increased pressure at that limit will reduce the effective distance. There is certainly a limit to the effective distance of the best shot-guns; and overcharges of powder will reduce the effective distance from the same cause that an over-pressure will reduce the distance to which water can be thrown.

Heavy or overcharges cause heavy recoil, which is not only unpleasant to the shooter, but detrimental to good shooting. The force of the recoil backward is at the expense of the force of the discharge forward. This fact is very easily demonstrated. Take a gun that weighs 8 to $8\frac{1}{2}$ pounds; have the shells loaded with 5 drams of powder and $1\frac{1}{4}$ ounces of shot. Let some small man, who weighs about 140 pounds and who has more pluck than muscle, fire a few of the shells at a target forty yards. Then have a large, muscular man, of 210 pounds weight, shoot the same gun with a similar charge. The results will be found very different. The heavy, muscular man by his weight and muscle will hold the gun square to the work, and put all the force of the discharge on the projected shot. The small man, if quite active, will keep on his feet, but when he examines his target will find it just as much poorer as the gun kicked him harder than it did the heavy man. There can be a certain amount of recoil that is not unpleasant, but rather a satisfaction; charges just up to that point will be found very effective. Charges would vary according to the weight of the gun, as well as the weight and muscle of the shooter.

I hope good may result by a full discussion of this subject.

Names of the Parts of the Breech-Loading Gun.

ALPHABETICALLY ARRANGED.

Action.—Used generally, such as “snap action,” “side action.”

Action.—Used specifically, being the iron body which lies between the barrels and the stock.

Back Action.—When the locks are bedded into the stock alone.

Bar Action.—When the locks are bedded partly into the stock and partly into the action, frequently likewise called “Fore Action.”

Bolt.—The part which, in a snap gun, passes into the lump of the barrel to hold the barrels into the action when the gun is closed.

Breech.—The end of the barrels in which the ignition of the powder takes place.

Bump.—The corner of the stock at the top of the heel-plate.

Cases.—A term used for cartridges when empty.

Chambers.—The enlarged spaces made for the cartridges to be inserted into.

Cartridges.—Cases when loaded. Made of paper or metal. Paper cases are cylindrical. Metal cases for shot-guns are likewise cylindrical. Metal cases for rifles are largely made what is termed “bottle-nosed,” *i. e.*, the part which contains the powder is one or two bores larger than the actual bore of the weapon, in order that being wider a shorter case may be used and the proper charge of powder retained. The 12A metal shell can be used in a gun chambered for the common 12-bore paper shell, but the 12B metal

case is too small for it. Similarly with 10-bores. A gun bored for the "B" metal will not, of course, take the paper case.

Cap.—The metal covering placed on the end of the handle when it is pistol-shaped.

Comb.—The top corner of the stock on which the cheek rests when firing.

Counter-Sink.—The recess in the chambers in which the rim of the cartridge fits.

Cross-Bar.—The small bar which, when the barrels are falling, presses out the extractor.

Direct Fire.—That shape of action in which the plungers lie and strike the ignition horizontally. (See "Oblique Fire").

Extractor.—The part which, when the gun is opened, partly or altogether ejects the discharged cartridge case.

Fore-end.—The wooden piece under the barrel.

Guard.—The part which protects the triggers.

Handle.—The part of the stock gripped by the hand, and which may be either straight or pistol-shaped. (See *Cap.*)

Heel-Plate.—The metal base of the stock, and which may be either solid or "skeleton"—*i. e.*, existing merely at the edges all round, or "tips"—*i. e.*, only at top and bottom.

Lever.—The part by which the gun is opened or closed. This may be on the top ("Top Lever,"), side ("Side Lever,"), or under ("Under Lever.")

Loop.—The projection under the barrel to which the fore-end is fastened.

Lump.—The iron piece soldered on to the barrel, and which descends into the action, where there is a recess prepared for it.

Oblique Fire.—That shape of action in which the plungers lie and strike the ignition obliquely. (See “Direct Fire.”)

Plates.—The sides of the locks.

Plungers.—The pins which are struck by the hammers, and which, in consequence, strike the caps of the cartridges.

Ribs.—Those parts of the barrel above and below which connect the two tubes. (See “Tubes.”)

Scears.—The parts of the locks which, when touched by the triggers, release the tightened mainsprings.

Strap.—The metal “peninsula” which runs from the action between the hammers down the stock

Toe.—The lower and most extreme point of the stock at the bottom of the heel-plate.

Tubes.—The two barrels before they are put together.

Tumblers.—That part of the lock with the two notches in it. The notches are by the artisan called bents; “a rose by any other name would smell as sweet.” These notches catch the scear and constitute “half” and “full” cock.



WING SHOOTING.

The following suggestions are designed especially for the beginner, or young sportsman, although not altogether inappropriate to many old and experienced ones. As to the selection of a gun, that has become simply a matter of taste; very good guns are so cheap there is no excuse for getting a poor one.

The best for all-round shooting is a twelve bore; select the straightest stock you can handle with ease. The length of the stock, from the front trigger to the center of the heel plate, should be from $13\frac{1}{2}$ to $14\frac{1}{4}$ inches. Short, straight stocks are really easier to handle, and will prove more successful in the field.

The beginner will find it very important to learn to handle his gun before entering the field. The important points to observe are ease, grace and precision.

It is almost an invariable rule that the man who handles his gun gracefully is a good shot. To learn to handle a gun in this manner will require careful and persistent practice. An hour each day, spent in your room, practicing the art of throwing your gun to your shoulder gracefully, and in the right position, will be of great service in the field; you will also find it of great benefit as an athletic exercise, much better than club swinging to develop the muscles of the arms. The best position in trap shooting, to resist the recoil of the gun, is to stand firmly on the right foot, the left well advanced, with knee slightly bent, and the body well forward. This position, backed with a little moral resistance, will successfully resist the recoil of heavy charges without injury to the shoulder.

Now that you have the proper position of feet and body, grasp the gun with the right hand at the grip, with your finger lightly on the trigger; with the left hand, grasp

the gun at, or in front of the fore end; hold the gun, with the arms extended just free from the body, with the muzzle elevated at about sixty degrees and the right hand about level with the eye, and the breech-plate below the elbow; bring the gun *deliberately* (and at the same time as quickly as possible) to the shoulder. This is done by simply dropping the muzzle and raising the breech, or butt, to the shoulder with the right hand so placed as to require but little change.

The butt of the gun should rest firmly against the shoulder, well toward the breast, and not on the arm, keeping the elbow well out from the body and the left arm extended almost straight, as if pointing at the object you are shooting at, as it is with this arm you control your aim. In this way you can easily carry the sight on a moving object. An hour each day spent in study and practice will soon make you proficient in handling your gun, as well as a pleasant muscular exercise.

Inasmuch as human nature is one bundle of habits, it is quite important that they be correctly formed, for once formed they are instinctively followed. The old saying that "it is hard to teach old dogs new tricks," is a true one; hence the importance of starting aright. While in the pursuit of game, carry your gun habitually in one position; this may seem unimportant, *but don't forget it*. To become a successful wing shot, form a habit of instantaneous action, (when you detect the presence of game) and it must never be lost sight of.

Carry your gun in a position that you can easily and promptly throw it to your shoulder with the hammers at full cock, and *never* forgetting the direction of your hunting companion, or dog, and under no circumstances point your gun toward them; then you will never mourn the accidental loss of a prized companion, or valuable dog. A very good

position in which to hold or carry a gun with a pistol grip is to grasp the gun at the grip with the right hand, with the elbow close to the body and the barrels of the gun rest against the shoulder, with the hammers against or just below the front of the shoulder, the muzzle pointing almost straight up, or inclining slightly to the rear; this is an easy, safe position, and the habit of carrying your gun in this manner is soon acquired. Another mode is: with the left hand grasp the gun at or directly in front of the fore end, with the right hand on the grip and the index finger lightly pressing the trigger, with the muzzle pointing toward the ground from two to three feet in front of you; this is a very good way to carry your gun but more fatiguing, if long continued. The last position, with the muzzle elevated, is also good, but not so free from accidents to your companions. Commence operations by firing at the first and every bird flushed within range. Don't wait for a better shot, the first is always best. Be quick; the quicker, the greater will be your success, but at the same time be calm and as deliberate as you can with the quickness of your motions. Remember that *hurry* does not mean *flurry*. You hear a great many men excuse their misses by saying they shoot too quickly. That is not true, they shoot in a flurry.

The true way is: Bring the gun to your shoulder; see the bird in full view over the sight of the gun, then pull the trigger. Don't be discouraged if you miss, for all men are inclined to overshoot at first; but shoot at any rate, as you will soon establish a sympathy between your eye and finger; that is, as soon as the eye has found the bird, in the proper place over the barrels, the finger will instinctively pull the trigger. Sympathy between the eye and finger is absolutely requisite in successful shooting. There are many important points, such as distance, speed, and direction, judgment in all of these particulars can only be acquired

by long continued practice, The speed with which ducks fly, range from 60 to 90 miles per hour. When flying at the rate of 60 miles, a duck will pass you at the rate of 11 feet in a tenth of a second; and at a rate of 90 miles, would pass 16 feet in the same time.

The following table gives the result of experiments made by Alfred M. Mayer, Professor of Physics in the Stevens Institute of Technology, Hoboken, N. J., taken from a report read before the American Association for the advancement of science, at Boston, on August 31, 1880, and published in the *Forest and Stream*, of October 26, 1880.

The velocity of shot was determined by a very ingenious contrivance called the "chronoscope." Only a portion of the table is given here, being quite sufficient to establish the mean velocity of shot with a given charge of powder and distance:

10 GAUGE, 4 DRAMS POWDER, $1\frac{1}{4}$ OUNCE SHOT.

Size of Shot.	Velocity 30 yards.	Velocity 40 yards.	Velocity 50 yards.
No. 3	989 feet.	911 feet.	872 feet.
" 6	966 "	883 "	806 "
" 8	920 "	874 "	776 "
" 10	848 "	756 "	669 "

12 GAUGE GUN, $3\frac{1}{2}$ DRAMS POWDER, $1\frac{1}{8}$ OUNCE SHOT.

Size of Shot.	Velocity 30 yards.	Velocity 40 yards.	Velocity 50 yards.
No. 3	844 feet.	754 feet.	696 feet.
" 6	825 "	739 "	600 "
" 8	816 "	749 "	607 "
" 10	796 "	680 "	610 "

Each measure of velocity given in these tables is the mean velocity obtained from several experiments, varying in number from three to six. The headings, velocities at 30, 40 and 50 yards, have reference to the speed with which they passed over these points.

The following quotation is from the close of Professor Mayer's paper. The entire is of much interest and directly to the point, but too long for insertion:

“The third fact which these experiments show is that the proper charge of shot in a 12-gauge gun for upland shooting is $1\frac{1}{8}$ oz. and not $1\frac{1}{4}$ oz., as has of late years been the practice to use; for the tables show that with $1\frac{1}{8}$ oz. of shot and $3\frac{1}{4}$ drs. of powder an average velocity is obtained which requires 4 drs. of powder to give $1\frac{1}{4}$ of shot a velocity equal to that given by $3\frac{1}{4}$ drs. to $1\frac{1}{8}$ oz. Now, 4 drs. of powder, if not fired from a gun weighing at least 9 lbs., and from a good, strong, muscular shoulder, is disagreeable. The effect on the body, and especially on the brain, is neither conducive to pleasant nor to good shooting. The number of pellets in a charge of $1\frac{1}{4}$ oz. of No. 8 shot is 499. In a charge of $1\frac{1}{8}$ oz. of the same shot there are 449, therefore only 50 pellets more in a charge of $1\frac{1}{4}$ oz. than in a charge of $1\frac{1}{8}$ oz.; and surely the want of the 50 will not cause a good shot to miss his bird with 449 pellets, nor will the addition of the 50 give a bad shot any more chance of bringing his bird to bag with his 499 pellets.

“I wish now to show to the association, and especially to those members of it who are sportsmen, other applications of these experiments to the art of shooting on the wing.

“There are two styles of shooting on the wing—one is called ‘snap-shooting,’ where the shooter, on selecting the bird which he wishes to bag, quickly brings the gun to his shoulder and at the instant it is in place, fires. If the bird is a cross shot, he determines at the moment of fire the dis-

tance to which he should direct his gun ahead of its flight, this distance depending on the velocity of the bird's flight and on his distance from it. This manner of shooting is practiced the more generally by upland gunners in shooting quail, grouse and woodcock.

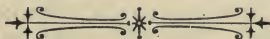
"The other style of shooting may be designated as 'the swing shot,' in which the gunner swings his gun ahead of the cross flight of the bird till he attains the proper distance ahead of it, and then fires; but he keeps his gun moving with a regular angular velocity till even after its discharge. This method of shooting is, in my opinion and from my experience, the proper method whenever it can be practiced, and is certainly the only one which has been found successful in the shooting of bay fowl, as ducks, brant and wild geese. Yet there are sportsmen who will contend that they merely follow the bird with the gun, and discharge it while it is pointing directly at the bird. I put this opinion to the test this summer in the following manner: Four willets came over the decoys flying in line with a good speed. With my gun I followed the first bird coolly and accurately, and kept the gun moving regularly after its discharge. Instead of killing the first bird, the third from the leader dropped dead.

"To give a rule applicable to all gunners for the distance at which a gun should be held ahead of a bird is not possible. Some sportsmen follow a bird, and then after reaching before it the proper distance suddenly stop the angular motion of the gun and then fire. Others, after following the bird a short distance, give a quick, lateral motion to the gun and then fire. Others, again, bring the gun with a lateral motion ahead of the bird and keep the gun moving till their experience decides the proper distance ahead of its flight, and then fire while the gun is keeping its previous regular angular velocity.

“For the simple illustration of the bearing of these experiments on the art of shooting on the wing I will suppose that at the moment of fire the gun is stationary; in other words, that we are firing ‘snap-shots.’ If the bird has a velocity across the line of sight of 30 miles an hour (*i. e.*, 44 ft. per sec.), and we are using charges in a 12-gauge gun of $3\frac{1}{4}$ drs. of powder and $1\frac{1}{8}$ oz. of shot, we will have to shoot about 5 feet ahead of the bird if it is flying at a distance of 30 yards; at 7 feet ahead if at a distance of 40 yards, and 11 feet ahead of the bird if at a distance of 50 yards.

“These distances ahead for cross shots at birds flying at the rate of 30 miles an hour, may appear out of all reason with the experience of many sportsmen; yet if you will place a stick 5 feet long at 40 yards and ask the same gunners if they would hold ahead of a bird by that length if it were going with a velocity of 30 miles, I venture to say, from my experiments with them, that they will say, ‘Of course; that is only about 18 inches,’ so difficult is it to determine a length at a distance while sighting along the barrel of a gun.

“I will conclude with the remark that the study of this paper will not make a good shot on the wing no more than a description of how to perform on the violin will make an accomplished violinist. But the results of these experiments are of value, and cannot but improve the shooting of an accomplished sportsman, if they are practically applied.”



BORE OF SHOTGUNS.

There are practically three kinds of boring for shot-guns—full choke, modified choke, and cylinder bore. A choke bore is of two kinds; in one the barrel is a true cylinder to within three-quarters of an inch of the muzzle, when the bore gradually contracts to the end. The other kind is called jug choke; that is, when the choke is accomplished by enlarging the bore from three-quarters of an inch of the muzzle down three or four inches. Full choke does not have reference to the amount of contraction at the muzzle by the per cent. of shot it will put in a given circle at a given distance. Guns that will put from three to four hundred pellets, No. 8 shot, in a 30 inch circle at 40 yards, are full choke. A good cylinder bore will put from 150 to 180 No. 8 shot in a 30 inch circle at 40 yards.

For wing shooting for any small game a cylinder bore is much the best. Choke bores are best for ducks and larger game. Cylinder bored guns shoot buckshot better than choke bores. It is not advisable to shoot buckshot in a choke bore, even if they chamber loosely at the muzzle of the gun.

The best all-purpose gun is a 12-gauge 30 inch cylinder bored seven pound gun. Would prefer a smaller bore rather than a larger. All late experiments are favorable to small bore and very light guns.

Always be cautious, calm, and deliberate, under all circumstances. Take a day's tramp through the fields or woods whenever you can. There is a proverb among the Arabs that the "days spent in the chase are not counted in the length of life." True field sports not only prolong a man's life, but makes his life more vigorous, in both mind and body, thereby giving a clearer and better understand-

ing of the true philosophy of life, which should be to love the world and mankind, and do all the good you can.

The caliber, gauge, or bore of shotguns, is determined by the number of round lead balls, of the exact size of the bore, which would weigh one pound. Thus ten balls that would weigh a pound would be the ball for a 10 gauge, 12 balls to the pound for a 12 gauge, etc. Muzzle-loading rifles were gauged in the same way, but rifles are now gauged by the one-hundredths of an inch; thus a 22 caliber rifle is one in which the bore of the gun is just $\frac{22}{100}$ of an inch in diameter—a 45, $\frac{45}{100}$ of an inch. When the amount of powder and lead is given the first figure refers to the caliber, the second ones to the amount of powder, and the third to the weight (in grains) of the bullet; thus a 45-70-420 is a 45 calibered rifle shooting a ball weighing 420 grains and charged with 70 grains of powder.

The theoretical length for gun barrels is not less than 43 times the diameter, or more than 47 times the diameter of the bore.



MISSFIRES, CAUSE AND CURE.

The causes of missfires are numerous, prominent among which are defective ammunition, weak mainsprings, defective plungers, and defective rebounding locks. Rebounding locks are made in various ways, yet all on the same principle; and that is, the force of the blow of the hammer is given by the mainspring for two-thirds or more of the distance it passes, when, by various devices, the mainspring is released and the stroke finished by acquired momentum. When this momentum has to carry with it much back pressure, as in common English guns, missfires often occur.

The back pressure is the power that brings the hammer back to a half-cock, called rebounding. The best rebounding locks are those that require the least back pressure to accomplish the object. This can be easily tested by holding the trigger back with the finger and observe the pressure required with the thumb on the hammer to shove the hammer forward to the plunger. Plungers that strike obliquely, or at quite an angle, or plungers that are too short, blunt, or sharp, or don't work free; primers that are imperfectly seated in recapping, are among the causes of missfires.

REMEDIES.—Weak mainsprings suggest their own remedy. Defective ammunition is, as a rule, rare. Defective rebounding locks can, in most cases, be remedied by a first-class gunsmith. When the plungers strike at quite an angle the plunges should be taken out and filed flat on the end, if they are long enough. A plunger with a flat end being sharp on the corners, will cut into the primer instead of sliding down it, and in most cases remedy the defect; also flattening the ends will remedy inclined plungers that strike the primer too low down. Plungers that are sharp-pointed are apt to cut through the primer; in this case the gun will

throw fire, foul the plungers, and often burn the face of the shooter. Plunges should occasionally be taken out, cleaned and oiled. If the gun fouls much at the breech-work, or in the plungers, by examining a shell after firing it will be found that the primer has been cut through by the blow of the plunger sufficiently to permit the escape of gases. In this case, the plungers are too sharp; flatten them with a file. In recapping, shell primers will be rendered more sensitive by having the boss, or projection of the recapper that forces the primer in place flat instead of, as usual, concaved. However, the concave recapper is best, with properly constructed locks and plungers.



CHOICE OF A HUNTING RIFLE.

How often the question is asked, "Which is the best hunting rifle?" The question is an unsettled one, and will never be answered satisfactorily to all inquirers.

Inasmuch as a rifle is not necessary in the pursuit of small game, it is presumed that the question has reference strictly to large game, such as is found in the north and west, but if the rate of shameless butchery and destruction continues for a few years there will be no occasion for a hunting rifle of any kind. The choice of a hunting rifle depends entirely upon the kind of ammunition it uses. This has no reference to muzzle-loaders, for they are a thing of the past, so far as hunting is concerned. Any of our modern, regularly manufactured breech-loaders, are good ones; the caliber, quantity of powder, and of lead they use, is the important question. Important as the weight of the bullet is, by the following table it will be seen that caliber is no index to the weight of the bullet used. Take a list of different cartridges and compare them.

The first column of figures represent the caliber in hundredths of an inch, the second column the number of grains of powder, the third the number of grains of lead:

Express Cartridge.....	50	95	300
Sharp's Sporting.....	50	90	473
Sporting.....	50	70	425
Remington	44	90	470
Government	45	70	405
" new model.....	45	70	500
Sharp's Special.....	45	100	500
Ballard.....	38	55	255
Winchester	44	40	200
" 	45	75	350
" 	45	60	300
Ballard.....	40	70	330
U. S. Government.. . . .	50	70	450

This list comprises about all the rifle cartridges. Light bullets have the best trajectory; heavy ones the greatest penetration, hence the greatest killing power. The .50-95-300 Express is pronounced by the experienced hunters of the West a failure and as no good at all. Sharp's Special .45-100-500 as the most deadly, hence Sharp's rifles have a reputation in the western territories as being the best rifle made. The Springfield, or regular Government service gun .45-70-405, the next best. On the frontier it is called a needle gun. It will be seen that the practical, matter-of-fact hunters select as the best rifle the one using the heaviest bullet.

Quantity of powder and weight of lead is all there is in choosing a rifle, as any well made rifle, using the Sharp's Special, would be as effective as Sharp's rifle using the same ammunition. Select a rifle that will use the most readily procured ammunition, which would be the Government .45-70-405. Whatever rifle you choose, be sure to choose one that is chambered for the 45 Government, for the Government ammunition can be had at any trading or military post in the West, and where special ammunition could not be found. The 45 Government cartridge has sufficient penetration to cleanly kill the largest game we have in the country, and it has no unpleasant recoil. If any man has lost a large number of "grizzlies," and can stand a kick equal to a government mule, it would be advisable for him to use a .45-100-500 Sharp's:

The best sights for a man whose vision is perfect and clear is the plain, open sight of the Rocky Mountain pattern; for one whose vision is imperfect, or failing, Lyman's hunting sight is the best. The front sight should be a pin-head or ball, and at least 5-16 of an inch high, with the ball nearly one-eighth of an inch in diameter, and the point-blank of your rifle should be at least 100 yards.

Point-blank in rifle practice is the exact point at which the bullet crosses the line of sight. There is technically two point-blanks, or two points where the ball crosses the line of sight; the first one is not far from the gun in long range shooting. The point-blank referred to is always the second point where the bullet crosses the line of sight.

The sights of a hunting rifle should be so arranged that the point-blank would be at 100 yards; any intermediate distance, an allowance should be made for the rise of the ball while passing this distance, to prevent overshooting your object. Vernier sights for hunting are of little practical importance, for in hunting, distance is unknown and is simply guess work. The eye, over fixed sights, with practice will soon learn to judge distance and the necessary elevation or depression, and much more quickly than in any other way.

The following letter, signed "S," appeared in the "*Forest and Stream*" November 24, 1884, and is a sarcastic and ironical summing up of the many earnest communications on the same subject which preceded it. It is here reproduced in full, and no more likely to confuse than many that were written with the design of being instructive:

LUCUS A NON LUCENDO.

I have read with absorbingly thrilling interest the few articles on "Choice of Hunting Rifles," which have from time to time, during the past century, appeared in the *Forest and Stream*, and although I have no use for a rifle, and perhaps never shall have, excepting to shoot rats, still, like the authors of many of the aforesaid articles, I can imagine what kind of a rifle I should want in the presence of a trumpeting elephant, charging grizzly, nimble deer, or zig-gagging snipe, and so as these articles appear to be "runnin' to emptins," before the polls close, I should like to

show you what kind of a rifle I choose. Modesty and some ignorance have prevented me from appearing before, but now I suppress the former, and having the combined ideas of the said articles aforesaid, I can form some idea of my own as to what I want.

The perfect hunting rifle has not yet been produced. We have had attempts on paper and at different armories and gun works, but good as some of the weapons have been, there has arisen some objector or other who shows convincingly that the gun won't do, and so all that labor is lost. We don't seem to get any nearer perfection, and it is just possible as long as people differ, we never shall. Now, it would be supposed that a gun that will kill one deer will kill any other deer of the same kind, if hit similarly, but we find it is not so. It is a curious and inexplicable fact, as witness the total disagreement of Western deer hunters as to the perfect deer gun. One wants a .45-125-360 double-detachable—reversible pin-fire repeater, and the next one must have a .40-226-341 multiplex-extractor, combined safety bolt and a linch-pin single fire—nothing else will do to kill a deer with. One man never went out with a repeater and got anything but tired out, and he has heard time and again how some other hunter in a critical moment, when an angry grizzly was rushing at him with open arms and mouth, had the carrier-pin-get-foul of the breech-hammer, whereby the trajectory caught on the cannellure and stuck in the collar. Of course the man got left. Then the other fellow tells how he pumped lead into buffalo and Utes all day until the gun had to be cooled off in water, and it worked all along as smooth as a piston rod. Which of these guns will best kill a deer? Either will probably, at times, put a ball into leg or paunch instead of the eye, so that neither can be called a perfect weapon. Then another hunter comes to the fore with a gun that

might be styled indestructible. He was hunting on the side of a mountain in winter. Snow-slide—hunter caught in a tree-top—gun keeps on—found next spring—nothing left but the bore, but it slew that very day three deer and a grizzly. Next week a man came in from hunting and sat his repeater up in the corner. Servant came in to dust the room with feather duster—accidentally hit gun—chamber thereof twisted so badly had to be sent to factory. Such experiences as these naturally cause a man to ask what he can depend on.

Now, as to accuracy, it makes a vast difference in my estimation whether the point-blank of a rifle is in inverse ratio to the drop of stock. A crescent-shaped butt with bottle-nosed cartridge, 450 to the peck, will make a fearful hole in an animal if the stock is properly checked. The checking of the animal depends largely on this latter. But after all it is the shock that kills. Ask any man who has had a current from a Brush machine sent through him. The coming gun is the one having the greatest amount of shock in it. A sort of paralytic or apoplectic shock. We all know how this acts on humanity, why should it not act similarly on animals. True they (the animals) might run some after being hit, but it would be an erratic, short-lived flight.

In the center-fire cartridges the bearing surface of the ball when impinging on the twist naturally suffer an appreciable loss of motion caused by the fulminate being placed too far back of the magazine, consequently the upset is reached before the breech-block can escape. Such being the case, it would seem highly important that the butt-plate which interferes with the prompt action of the "neck" should be narrowed to a point where the groove will barely miss the shoulder. Otherwise derangement of sight will ensue and the approximate curve of the bullet will be

sufficiently variable to cause trouble. There is no necessity of defining this. "Bengal Sepoy's" pessimistic view of the disproportion existing between the cost of cartridges and weight of bullet will deceive no one. The fact is, the striking energy is to the muzzle velocity as the pull is to the trigger. At 335 yards I have rarely done better than 7 bullets into 6 long by 8 wide by 5 high, 10½ bullets into 4 wide by 8 long by 9 high, and 9 bullets into 7½ round. This with elongated swedge, Skimmerhorn tube and loop-hole, is a beautiful weapon, because harmless in the hands of the didn't-know-it-was-loaded idiot.

A. J. & W. Folly is hardly so good for chipmunks as the new U. S. Express, .11-15½-21, which paralyzes without mutilating. The trajectory of this needs to be flattened a little, however, as this species of game rarely rises over 100 yards. For gray squirrels .32 is much too large, .22 too small; I should advise, say .23¾, bullet irregular rhomboid with rapidly decreasing circumference. For fox squirrels we need a .6-41-26, four turns to the inch, modified drop. With due deference to "J. T.'s" knowledge and experience with California rodents, I affirm that Eastern squirrels need different ordnance. For deer, if I were in Florida, I should, by all means, use the regular .31-64-154, as deer are known to be smaller there than in Pennsylvania. In North Carolina the most effective weapon would be a .33-69-161, as deer there are considerably larger, having more to eat. In the Northern States, east of the Rocky Mountains, the well-known Blunt 8mo. .42-71-209 lightning express, will kill cleaner than any other, if the gun is clean. A mule deer, as the name implies, requires much heavier ordnance to fetch him to time. If permitted, he will carry away a large amount of lead and expletives. The coming gun for this kind of game, elk and caribou, is the portable electrical Gatling, Siemens' battery, and Brush dynamo.

This would seem to be the gun par excellence for antelope, for they can usually be seen a great way, and it is necessary to shoot as long as they can be seen. We frequently read of hunters emptying their Westchesters at them and then following the wounded game all day. This in itself is enough to condemn the gun. We want a gun, the ball of which, has an affinity for the particular game it is made for, and which it will search out and corral without needless waste of time and muscle. Some one wants to find such a gun quickly, too, for before many days there will be no use for rifles, except to show our children as weapons "we used to shoot deer with before they were extinct."

Such are my ideas on the "Choice of Hunting Rifles." If they help any one in his dilemma caused by so many conflicting views published in *Forest and Stream*, I shall feel that they have accomplished wonders. S.



Hunting Large Game, and Woodcraft.

The art of hunting can not be learned from books, but a few hints upon the most important points will be of some value to the man who goes into the woods but once a year, and then only for a few days or weeks. A good hunter is born to the craft; not even one Indian in ten is a good hunter, although they are children of the woods. Never start out on a full day's hunt without taking along a good, substantial lunch, and plenty of it; and always be provided with a little package of tea, and one of salt, also a tin-cup; there may be an "emergency" when these things would more than repay the trouble of carrying them along.

It is taken for granted that hunters' camps are always on the bank of some running stream, or lake, or on some lumber road, or trail, near a spring or brook, and that each hunter is provided with (in addition to gun and ammunition) a compass, a light hatchet, or camp ax, a small butcher knife, or large pocket knife. With the aid of the compass you can establish in your mind the course of the river, road, or trail, or the "lay" of the lake, as the case may be.

Observe the range of hills, the class of timber, or any peculiar trees, and other special landmarks in the vicinity of the camp.

All will be of great importance to the young hunter, as they will familiarize him with a strange woods and give him confidence in venturing from camp.

If but a few days, or a week, is to be spent at the camp, after it has been thoroughly put in order, it is better to spend the first two days in establishing the landmarks, whereby camp may be easily found.

The pleasure of hunting, as well as the success, depends a great deal in the confidence and assurance with which

you can venture into the woods five or six miles from camp, which is quite far enough where game is reasonably plentiful.

By taking the following precautions a party of four in two days can establish such a system of landmarks for a radius of six or seven miles; that camp can easily be found at any time. It can be done in this way: Early in the morning each of the four men in the party take a different cardinal point of the compass and follow the course as directly as he can, by his compass, and with his hatchet blaze the route on the prominent trees, no farther apart than they can easily be seen, from one tree to another; making one blaze on the side next to camp and two on the side from the camp; in this way the two blazes establish the direction of the camp. By getting an early start, six or seven miles can be blazed by two o'clock, or a little later; then you can hunt leisurely back to camp, keeping a close watch for game and deer sign, such as trails, runways, or crossings. Observe if the bushes have been freshly scraped by deer rubbing them with their horns; also notice if the ground in places has been pawed, or scraped, as hunters call it. Where deer "use" much, their signs are plain to be seen; go slowly and carefully at such places, keeping a sharp lookout for deer, as you are likely to see one; stop often near a tree and scan the surroundings thoroughly, for stealth and silence, in this case, is the price of venison.

The next day each man take an intermediate point of the compass, performing the same operation of blazing, then hunting slowly and stealthily back to camp.

Now you have for a radius of six or seven miles from camp, and entirely around it, eight blazed lines leading directly to camp, and you can now hunt at will, devoting all your ingenuity and mind to the pursuit of game, and at no time will you be very far from some of the blazed routes to

camp. You will find a supreme pleasure in being able to venture from camp with confidence, and it will more than pay for the trouble; also the success of your hunting will be greater, as you can hunt until quite late in the evening, which is the best time to look for deer, when otherwise your anxiety to find camp would occupy your thoughts and detract from the pursuit of game.

These instructions are not for old woodsmen or hunters, as they have by long observation and experience learned how to keep their course, and it seems almost instinctively so; however, they are not infallible, for if closely questioned they will admit having spent many lonely nights in the woods, through their inability to find camp.

The young hunter will find that it will more than repay him to take any and every precaution that will give him confidence, courage, and assurance. All kinds of large game is constantly on the alert; their hearing is acute, and their eyesight is very sharp, and their sense of smell is phenomenal. They are at all times on the lookout for an enemy; therefore, to successfully outgeneral the wary denizens of the forest, requires a species of craft that is almost innate, or the result of long, very long, experience. Silence, stealth, patience, and endurance are the main requirements. By observation, learn the places where deer use, and feed, or routes they travel. In traveling, deer follow each other, even to making distinct trails; these are called runways. After you have found their feeding grounds and runways, if you have the patience to sit "*quietly* on a log" and the endurance to withstand the cold for a few hours each day, morning and evening, you will certainly be rewarded with a shot at a deer, at short range. A deer coming from the windward toward you will pass within a few feet of you and not see you, provided you don't move, and remain perfectly quiet; also, a deer may even get scent of you, but he won't

run until he sees you move. Now is the time your gun should be in a good position to be easily handled, and with the least possible motion. A deer will not run from the report of a gun if he has not seen the hunter move. "Cultivate the art of sitting quietly on a log" or in the same manner, leaning against a tree. If in the vicinity where deer feed, or are in the habit of passing, your chances of success are ten times greater than in any other style of hunting. Stalking deer by their track in the snow, requires great skill and any amount of physical endurance, and can be practiced only by men of nerve and experience. The man that hunts but a few days each year and for recreation, who undertakes to hunt deer by following their tracks in the snow, in a strange woods, will be likely to find after he has followed the deer all day, without even getting sight of him, that he is many miles from camp, and with a very cloudy knowledge as to the true direction of camp; and is, in fact, lost. This is not a pleasant situation by any means; he consults his compass, and North is exactly where he imagined South to be; in his confusion he has forgotten whether the blue end of the needle points North or South; the fact is, he is completely turned, and don't know anything. Now, one of the things not to do is, don't get excited. There is not the least occasion for it; you are not the first man that was lost. Be perfectly calm, sit down and take a smoke; if you don't smoke, sing a song; or repeat the multiplication table, or do anything to keep from becoming excited, or panic-stricken. It is not an uncommon thing for old woodsmen to get turned around. When you become perfectly cool and collected you will have some idea of the direction of camp. If your camp is on a stream, or road, and if the stream or road run north and south, you certainly will know whether you are on the east or west side of it. If you are on the east side your camp

must be in a westerly direction, and your compass, as a rule, is right; if you will travel by it toward the west you will certainly strike the river or road. Carry your compass in your hand, and consult it often in order to keep your course. A man who is lost is inclined to travel in a circle, generally to the right; why this is so has never been satisfactorily explained. Men have been lost in the canebrakes of the South who have wandered around and around in the same circle, until they have died from starvation.

An old bear hunter in Arkansas told the writer how he worked it whenever he became turned around in a canebrake. He said he would cut the longest and stiffest cane he could find, then straddle it (as a boy does a broom-stick) and walk straight ahead, the long cane preventing his walking in a circle, and he was sure to come out soon by going straight ahead. Now, when you get lost don't "quarrel with your compass," it will take you to the river, or to the road, if you will follow it. After you have found the river, or road, unless you are quite familiar with either, it will be quite difficult to decide whether to go north or south to find camp. If it is near sundown, it is best not to try either direction until morning, but before dark fix up a comfortable camp for the night. Select a large, green tree, on high ground, for a camp-fire. Build your fire on the windward side of the tree, and prepare plenty of good wood for the night. It may be well to say here, that every man going into the woods should have a good supply of water-proof matches; a good substitute, if water-proof ones cannot be had, is to fill a small vial with good matches and cork the vial tightly; in this way they will remain dry, even under water. Prepare plenty of wood, as a fire in the dark woods is excellent company, and it adds greatly to a man's courage and keeps off wild animals. A good way to keep a fire all night is, cut with your hatchet two sticks, dry ones are best,



about eight or nine feet long, and as large as you can carry. Lean the sticks against the tree on the windward side, with the lower ends about four feet from the root of the tree, and the upper ends close together; stake the lower ends so they can not roll, or slip, then build a fire on the ends next to the tree with good, dry sticks; for kindling, you can find some pitch-wood on the side of a pine tree that has been burnt. It will take some little time to get your fire started, and after it is once started, as the ends of the stick burn off, they will slip down on the tree, and in contact with fresh bark, which will keep up the fire all night. One large stick is better than two small ones, but one man could not handle one that would be large enough to burn all night. This fire is not for the purpose of keeping you warm, but just a

sociable adjunct to a lonely camp, and if properly arranged it will burn all night and make a good light; by exercising a little ingenuity you can, with brush poles and bark, have a good, warm place to sleep near the fire, on the ground and against the tree. Don't make the mistake most campers do; that is, don't make a great big fire, a small one is better. The fire on the side of the tree will furnish plenty of light. Now that everything is prepared for the night, in your tin cup make a strong cup of tea, and if you have killed any game, salt and broil a piece, or with your ample lunch you will have quite a supper; as soon as it is quite dark and still, fire off your gun two or three times in quick succession; if your companions in camp hear you they will reply, when you can, by the sound, locate the direction of your camp; unless it is quite near, don't attempt to find camp until morning. Following streams in pine woods is very difficult, even in the daylight, and next to impossible after dark, as they are invariably bordered in places with swamps and thickets. If care has been exercised in fixing your camp, you will pass a comfortable night, and it will be one of the incidents connected with camping out that you will never forget. Old and experienced woodsmen can, by general observation, and certain signs, very nearly tell the points of the compass in dark, cloudy days, but only men of long experience would think of relying upon these means to guide them safely through the forest.

The mosses usually grow the heaviest on the north side of the trees, while the south side is generally graced with the largest and longest limbs. Trees blown down by the wind usually lie northeast, from the fact that the prevailing winds are from the southwest. The most reliable sign the writer has noticed is this: The tops of pine, spruce, and hemlock saplings, usually taper out into a long, slender branch, and especially is this true of the pine; and this

long, slender branch invariably points east, or in an easterly direction; that is, it leans or points toward the east. It seems to be a provision of nature for catching the first rays of the sun; the same fact is noticed in the inclination of house plants toward the sun.

When, by observation, you find a large per cent. of the slender top branches of the young trees pointing in about the same direction, you will find by comparison the largest and longest limbs are on the same side, that direction is surely the east, or a little south of east.

To recapitulate, when you are lost in the woods don't get excited, or become panic-stricken, and go rushing frantically through the woods, to no purpose, but be cool and level-headed, and trust your compass, and "a cool judgment will bring you out all right."



CARE OF AND CLEANING GUNS.

To prevent guns from rusting when duck shooting on fresh or salt water, give the entire outside of gun, stock and all, a coat or two of shelac varnish. Put on in this way: take a piece of woolen cloth, dip your finger in linseed oil and rub on the cloth; then put about a half teaspoonful of best shelac varnish on where the oil was put; then rub the gun briskly with two or three coats; there should be just enough oil on the cloth to prevent the varnish working sticky; this will give the gun a nice finish if properly done; beyond a fine polish, no varnish will be noticed; no better rust preventive can be found. The gun will always look new. So much for the outside.

There are two ways to look after the inside of the barrels. One is to clean thoroughly and oil well; in this case, the oil should be renewed occasionally whether the gun is used or not; any of the prepared oils called rust preventers are the best to use. A sure preventive against spots in gun-barrels has not yet been discovered. Gun barrels called Damascus are the most liable to get spotted, stub twist the least.

The spots commence first at the breech end and on the lower side, then gradually increase all around toward the muzzle, but rarely entirely to the muzzle. It is claimed the fulminate used in the primer is to the greatest degree injurious. An unloaded shell should never be snapped in a gun when it can be avoided.

So long as the rust spots are confined to the breech end of the barrels, it is very doubtful whether they effect the good shooting qualities of the gun. The writer's experience is, guns that are cleaned the least inside, spot the least; in other words, if guns were not cleaned at all inside, they would not spot at all. This experience is confirmed by over-

hauling guns that have been lost in ponds while duck shooting. One that was over a year in the water and mud, the other about six months before found; the inside of both when cleaned was just as bright as the day they fell overboard. The outside of one was ruined with rust, which is certainly good evidence that the residue of burnt powder must be a powerful rust preventive; had the guns fallen in the water when perfectly clean there would not have been a single particle of bright surface left. Hence, there can be no better rule than to clean and oil the outside of your gun every time after using it, and the inside just before using it; in this way a gun will retain a bright clear surface inside, longer than in any other way. To this there is just one exception, that is: in case a gun has been fired very rapidly until the barrels are very hot; in this case, the gun should be cleaned before the barrels cool, if left to cool, the burnt powder will bake on the inside and be very hard to remove; warm water is best to use in this case, but look well to cleaning the gun until perfectly dry; after using water and before putting away, fire a load from each barrel. It may appear a very slovenly way to put away a gun in a dirty condition inside, but the man who practices it will never have occasion to regret doing so, if he wishes to see bright clean barrels after they are cleaned.

Gunlocks should be taken off occasionally and cleaned; if they are much gummed up with oil and dirt, the best way to clean them is to have a kettle of hot rain water and soap, make a strong, hot suds, tie a string to each lock and churn it around in the hot suds until perfectly clean, it will surprise you how quick it is done; then; with a linen cloth, wipe well while yet hot; the heat will thoroughly dry all the inside parts, then oil the working parts with any good oil. Rust preventers are not oil; for the lock, use the best

lard sperm, or sewing machine oil. Don't be afraid to put your locks in hot water; water cannot be made hot enough in an open kettle to effect the temper in steel. In removing the lock use a smoothe square end screwdriver; use with care, so as not to mar the screw heads. If guns are put away in a woolen cover they will keep in better condition than in any other kind. The best gun cases are heavy canvass, lined with sheepskin that has a good coat of short wool; they will keep a gun in good condition as well as prevent bruising them in handling.



RUST SPOTS IN GUN BARRELS.

The following communications appeared in *Forest and Stream* January 12, 1882. They sufficiently explain themselves:

Editor Forest and Stream:

COLUMBUS, O.

I wish to take one more turn at the wheel which has been at work of late trying to grind the rust spots out of gun barrels, and give the crank a gentle turn, for I respect the various experiences and opinions as presented in your columns. I have noticed very plainly that, while one sportsman could find nothing but coal oil that would keep his gun in desired condition, another was positive it would not do. Others have tried peculiar remedies and have met with success, while there undoubtedly still remain a few whose experience would be directly to the contrary. Often have I gone to my tent after dark, tired and hungry, and, before I would give any attention to satisfy my appetite, would get out my wiping rod, tow, rags, sperm oil and vaseline, and go to work; would rub and scrub and clean my gun and lay it away carefully, and then in the morning take a peep through the barrels and find a spot here and there, which I gave credit to not quite enough diligence the night before. Now, my way is to wipe off the outside and oil properly; break the gun and oil breech piece, plungers, and, in fact, clean the outside, but do not touch the inside of the barrels, and I am positive that my gun is in as good condition to-day as it was when I first tried the experiment.

The information that I obtained from an old Californian (as per *Forest and Stream*, Oct. 20, 1881) was from Col. Horace Park, a resident gunsmith of this city, with whom I am well acquainted and know to be a man with great experience, and a superior mechanic.

I send to you herewith a very interesting letter, which

he has kindly written at my request, and I hope it may be of benefit to brother sportsmen.

FRANK N. BEEBE.

COLUMBUS, O.

Gun barrels made of clean, refined, homogeneous iron will not get the "measles." My theory, from observation, is that the finer the grade of barrels, as our manufacturers grade them, the more liable they are to "scab," as I call it. Take the fine Damascus barrels (so-called), that is, the barrels, with the fine, beautiful, curly figure. In the manufacture of such barrel the maker must use great care in welding—that is, nurse it carefully with the hammer so as to preserve the curl regular. As a result, the iron is not so close grained as it would be if spanked down right hard with the hammer, without reference to the shape of the figures, as in the common barrels. Of course all understand that the different figures and colors in gun barrels are made by a mixture of steel and iron, or different kinds of iron. In case of steel and iron being used, the iron—being softer—will rust easier, leaving the steel brighter, clearly showing the figure of the barrels. If not nursed much in welding, the figures will not be so perfect; but in case of steel twist, or any irregular twist made of small scrap iron and steel, such as needles, fish-hooks, nails and screws, the fagots are put under a heavy hammer, and so thoroughly incorporated as to almost make the iron of one nature and texture. Gun barrels made in this way will not spot under ordinary care. I discover from the various correspondents that the finer the gun and the more care, the more they spot. I believe that conclusion is almost an axiom; but some of your correspondents, on their dignity, appeal to "common sense" to prove such is not the case. If a farmer would daub his plows with a mixture of common blasting powder and water he could leave

his plows in the fence corner with no fear of their rusting. The real causes of spots in gun barrels are various.

I believe, with one of your correspondents, that the grades of powder that are called the best have more or less to do with it. The cheaper grades of powder, in our days of adulteration, have incorporated in them more or less soda in some shape. In blasting powder, soda is used altogether instead of nitre; and soda is known to be one of the best rust preventives we have. Any machinist who has ever used a solution of sal-soda for drilling, or as a drop on the tool when turning shafting, knows the same will not rust even if allowed to lie about the shop or yard for months. I find one of your correspondents changed from the higher to the lower grade of powder and found a cure for the rust business. I believe, in all business, results are what men are after. I have used, in comparison, the very best grades of powder, from C. & H. down, and have found by actual experience that just as good results are obtained from the lower grades of our best powder makers.

I am the "Californian" referred to by Mr. Beebe, and the fact referred to, that leaving your gun after shooting without cleaning until the gun is to be used again would preserve the inside in good condition, was first brought to my attention in California, at Lawson's Meadow, on the headwaters of the North Fork of Feather River, where I was prospecting. In going to the meadows I found the slough and bayous literally covered with ducks of all kinds. With my rifle I could make poor headway with the ducks. I went to Mr. Knight (who was running a ferry and the only man living in the meadows at the time) and asked if he had a shotgun. He had not; but thought there was in his woodshed an old army musket that some '49er had left there. He did not know what condition it was in, as he had not seen it for several years. This was in 1856. We went in search

of it, and finally found the old musket buried in chips and dirt. I, being a mechanic and iron-worker, took off the lock and with a little repair found that it would work, but it was badly eaten with rust. The outside of the barrels was coated with rust and the stock nearly rotted off. I took off the barrel and with a hatchet and iron wedge succeeded in getting the breech-pin out, it took but a moment to wash out the gun, and, to my astonishment, with the exception of two or three inches of the muzzle-end, the polish was as perfect as on the day the gun left the U. S. Arsenal. The gun had been banged about, without cleaning, for four or five years. The perfect condition of the inside of this musket led me to the conclusion that the proper thing to do was to leave a gun, after shooting, without cleaning—a practice which I have followed ever since and never have had any trouble with rust nor do my barrels ever lead.

Another sure test that a gun will not rust if left after shooting, was furnished at the Licking Company reservoir near here, last winter. "Johnnie Webb," as he is familiarly known, an old and expert hunter who lives at the reservoir, was out shooting, a year ago last fall; and by some mishap he capsized his boat and lost his gun, a Parker fine twist. He did not find the gun until late this summer after the water was very low. The gun lay in the water and mud over six months. The outside of the barrel was rusty and eaten away until it resembled an old, rusty file, but the inside, after being wiped out, was bright as the day it was lost in the water. I overhauled this gun myself, so I know.

There is no preparation that I know of that would have as well preserved the gun as the burnt powder did, and it confirmed my experience that it is safe to put away your gun without cleaning the inside; the outside must be looked after. One of the best ways to prevent rust on the outside, is to take a piece of heavy chamois skin and rub into it well

some mercurial ointment; wipe off your gun properly and carefully, and you will have no trouble with the outside.

Now, for the benefit of those very nice men who say to leave your gun without cleaning after shooting, is a very shiftless, slovenly way of doing things, I will say that if some ingenious man would get up a preparation of the residue of burnt powder, put it up in very small bottles, and labeled in gilt letters, some outlandish name, ending with "rust preventive," these men would buy it at the rate of fifty cents per bottle, and go to the trouble of wiping out their guns with it, and swear it was perfection.

No man, using a medium grade of powder, will ever have any regret for putting his gun away without cleaning the inside if he will try the experiment.

Will some one, familiar with the manufacture of powder, give some items through the columns of *Forest and Stream*, as to whether the best grades are strictly nitre, saltpetre and charcoal, and whether the lower grades contain soda in any form. If by using soda, gun barrels will be better protected from "scabbing," I think it would be well to know it. These discussions are valuable; let the good work go on.

CALIFORNIAN.



CAMPING OUT.

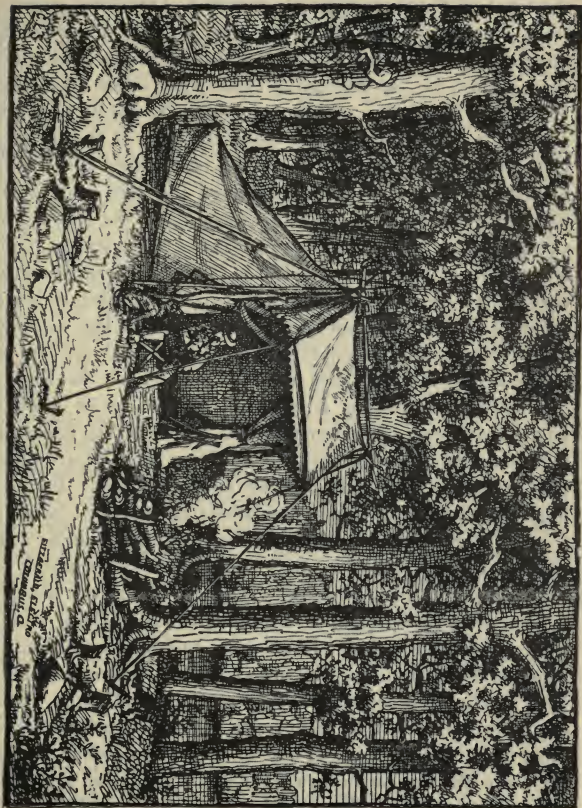
Nine-tenths portion of the civilized human family almost shudder at the thought of sleeping on the ground in open air; or even in a well regulated tent. "You will take your death of cold;" or get the rheumatism they will say. Such is not a fact, sleeping on the ground in the open air, with proper camping equipments is almost a cure for all the ills the human flesh is heir to. The writer knows "whereof he affirms," having camped out for ten consecutive years, in all kinds of climates, under all kinds of circumstances, with shelter and without, in mountain snow storms, and in dismal swamps without experiencing the evil effects, from what most people would call exposure. Sleeping in a room or tent warmed with a stove, is much more liable to produce colds than sleeping in the open air. Take a tent fitted up with the ordinary sheet-iron camp stove, about bed time, some member of the party will fire up by filling the stove with wood and pine knots, then retire; the tent will get as hot as a "torch-light procession," all will go to sleep only partially covered, or the blankets thrown back, the fire soon burns down and you awake up chilled through, that is you have taken cold. Only by the most judicious management can a sheet-iron stove be used in a tent without producing more or less bad effects to the occupants. When changing from a long camping tour, to hotels, or houses, great care should be exercised as to the sleeping apartments: Discard stoves or fire entirely; look well to the ventilation, see to it that one window at least is open; have the bed in such a position that there will be no draught directly over the sleeper; no matter what the weather is, be sure the sleeping room is well ventilated, as there is much more danger of taking cold in changing from out-door sleeping to a house, than, from house to out-door, but more of this when

tents and camp outfits are referred to. One of the evils camping parties are almost sure to encounter, is too much baggage; extra baggage in camp is an expensive, useless luxury; a continual source of annoyance. Parties contemplating a camping tour, should commence by studying how little baggage they can get along with. You will be surprised how little baggage is really necessary. Great big trunks are an abomination, don't think of a trunk for one moment, a common farm grain sack will be found most excellent; what is better, is a bag made of quite heavy canvass with a round bottom something like a U. S. mail bag, having a row of eyelets around the top to lace it up with a strap of lace leather, (such as is used for lacing machine belts,) the bag should be a little larger than a two-bushel grain sack; it will be quite sufficient to hold all the clothing and baggage, including blankets necessary for one man for a three months' trip. The amount of baggage really necessary for one man, is one strong woollen suit, two pair woollen shirts, two undershirts, two pair drawers, a half dozen pair socks, one coarse towel and a piece of soap, one pair of unlined single-soled cowhide shoes, the heels low, and soles very broad. If snow is likely to be encountered, a pair of gum boots will be very convenient, one pair heavy woollen blankets, or two pairs light ones, two gum blankets, or what is better, get at a hardware store two pieces of gum cloth, each in size about five by eight feet, one for a ground blanket and one for the outside, one small well-filled feather pillow, a pocket comb, toothbrush, and handkerchiefs, also a few needles, thread and buttons; a ball of strong twine, and a large needle. All the articles mentioned, except the suit you wear, can be easily packed in the canvass bag mentioned. The bag should be of the following dimensions: quite heavy canvass, forty-five inches in circumference, thirty inches long, a round bottom, with eyelets, etc. Also have a ring riveted

with a billet of leather on each end of the bag, to which you can buckle a long strap like a gun sling; this will be found convenient to handle it by, or in carrying, by slinging the bag on the shoulder. Don't forget the pillow, it is one of the most important parts of the outfit. Don't think of taking an overcoat; if the weather is cold, wear one of your blankets Indian style, it will be found quite warm and very much more convenient; with one gun and one fishing-rod, and the outfit is complete. You will find plenty of room yet in the bag, for fishing-tackle, ammunition, pipes and tobacco, for quite an extended trip,

Camping parties should consist of not more than four persons. It is quite pleasant to have a number of parties together; but parties of not more than four in number should be absolutely separate, and distinct. Each party of four should be composed of congenial companions; two even, will be found too many if either of them are irritable, peevish, or fault finding. One grumbler in camp will destroy the pleasure of the whole trip. The man in camp is a very different being, from the man in society, as a rule; therefore, look well for genial companions, as very much of the pleasure of the trip depends upon it. It may be a delicate subject, but should be talked over earnestly, and squarely, by parties starting out on a camping tour for the first time. It will go a long ways toward preventing much unpleasantness, if you have a clear understanding that no petty quarrelling, grumbling, or fault-finding, will be indulged in by any member of the party. This kind of an understanding will put each man on his guard; in other words, put him to thinking, and by just thinking a little, many trifling affairs could be turned to fun that might otherwise irritate. The camp work should be about equally divided among the party, then each member see for himself that he attends to his own part promptly

and willingly. Domineering and ordering about will be found a very poor lubricant for the camp machinery. Just remember the story of the lark and the farmer. The best way when you want anything done is to do it yourself. Camping parties while en route should go into camp for the night quite early, then everything can be prepared and made snug by daylight. Select camping ground with reference to wood and water; have both plenty and convenient. When the camp is just for the night the best place for the fire is against the windward side of a large green tree. The heat will cause a draft up the tree, which will carry away the smoke almost equal to a chimney. If the tree is not hollow there will be no danger of burning it down in one night, or even three or four. In selecting a camp-site for a camp of several days, or weeks, more care should be taken; when possible, select a place sheltered from wind and storms by hills or heavy growth of timber on the side of the prevailing storms, at the same time out of danger from falling trees or limbs; look well to the wood supply; don't forget to have an ax in kit; and for water, select a running stream, lake, or spring. Too much care cannot be taken as to cleanliness about the camp grounds; have a certain place for offal and garbage, and then see that it is all deposited there. The offal of fish, game, etc., if promiscuously scattered about, will soon make the grounds filthy and unwholesome; this matter cannot be too carefully looked after. If camping on a running stream, in the stream will be a good place to deposit the refuse of camp, if the current is sufficiently swift to carry it off. The following will be about the equipage necessary for a party of four: One wall tent, 10 by 12 feet square, wall two or three feet high, made of 8-ounce duck. The government wall tent is a good one, and will answer the purpose quite well, but one of the following description is very much better. A tent about



10 feet square, with a shed roof, the front about 9 feet high, the back 2 feet high. The front or highest side should have an awning running out, 6 or 8 feet, something like a porch;

the front of the tent under the awning should be opened, from bottom to top, like curtains, so that it could be opened out wide, like opening curtains; at the same time, there should be lap enough to close tight when necessary. With this kind of a tent a camp stove is wholly unnecessary, as a fire properly built under the edge of the awning in front of the center, will keep the tent warm and dry in almost any kind of weather. Arrange the tent and fire as follows: Pitch the tent with the opening to the leeward of the prevailing winds; directly in front of the opening, build a backwall of logs, or poles, six or eight feet long, which is easily done by driving stout stakes in the ground, slanting them back a little from the tent; pile up the logs or poles against the stake, one on top of the other, (with the largest in the bottom) two or three feet high, or higher—the higher the better. By having it quite slanting it can be chinked and a heavy coat of dirt or mud put on, when the backwall will last almost indefinitely. If boulders or stone are plentiful, a better backwall can be made of them. For fire dogs use short, good-sized green sticks, or stones, to hold up a good fore-stick, which will make a fire quite convenient for cooking; but little wood will be required to keep the tent dry and warm. A small fire properly built is better to warm by than a large one, to say nothing about the comfort of cooking. Don't make the mistake that most campers do, by building the fire so big that you can't warm by it. After the tent is pitched and back-wall built, cut a ditch around the whole business to prevent water from the rains from running into the tent or fire. The center of the fire-place should be excavated about a foot deep at least, and allowed to fill up with ashes and coals; this will be the bake-oven of the camp. Don't forget to cut a good stout poker of a green limb, five or six feet long; also cut a stake from a sapling well provided with limbs, cut off the limbs,

leaving stubs five or six inches long ; sharpen the big end and drive it firmly in the ground, on the right side of the fire-place, it will be handy to hang up the dish-cloths, towels, etc.; it will also be a place to lean the poker, as well as to hang a wooden hook, which will be convenient to handle pots and kettles with. A camp broom can easily be made by cutting a bunch of slim twigs and lashing them around a stick of the proper size for a handle. A broom made in this way is quite serviceable. Camp comforts depend largely on neatness, ingenuity, and industry of the party. Time spent in fixing up little conveniences about camp will be well spent. Now comes the cooking outfit. This may appear a little as though the cart was before the horse. But inasmuch as this is not a literary production in any sense, it makes but little difference. Detail and clearness are the points aimed at. The chest for the mess kit should be a light, strong box, with a hinged lid; dimensions about 26 inches long, 18 to 20 inches wide, and 14 inches high; this is quite large enough for the mess kit, of four men. The kit is composed of the following articles: Four tin camp kettles; tin is much better than iron, and will last quite as long. The largest one a straight up kettle about 8 inches in diameter and 10 inches high, with a good fitting lid; the next just small enough to go inside the large one, lid and all, and the third and fourth fit within each other, and in the same manner. All four will occupy the space of the largest one; even two more could be fitted in the same way, and would be found to be very useful. Two common water buckets, two large dish pans, (one for washing dishes, the other for mixing bread,) one of the dish pans should be about one inch larger than the other for the purpose of converting the two pans into a baker, which will be explained farther along. One large coffee-pot, three small mess pans, such as will nest, (two quarts each is large

enough) a half dozen tin cups of the kind that will also nest, the common pressed tin cup, with the lower end of the handle loose, answers the purpose; a half dozen each of tin plates, large and small iron spoons, knives, forks, and one butcher knife, one pepper box, one salt box, and one frying pan. The mess chest will hold all the articles named, except the water buckets, which can be carried outside. One other article would add much to the convenience of cooking, that is a tin reflector, such as was used by the Pioneer Mothers of this country. The "Land Lookers" of Northern Michigan have a folding tin reflector which they pack on their backs during their long tramps through the woods. When folded it occupies but little space, is quite light, and the "boss thing" for most any kind of cooking. The cooking is done by reflected heat, so that as soon as your fire begins to burn you can go to cooking bread, meat, or fish. For a mountain trip where transportation by pack mules, or burros is necessary, the camp kit should be reduced somewhat, and the box dispensed with. For the mess chest, substitute two empty champagne baskets, or regular packs, or baskets called paniers. The champagne baskets will answer quite well; they are very durable, and a pair of them will hold a large quantity and make excellent side-packs for an animal

Now for the commissary department.

"ARTICLE 1190, U. S. ARMY REGULATIONS."

A ration is the established daily allowance of food for one person, for the United States army. It is composed as follows: Twelve ounces of pork, or bacon, or one pound and four ounces of salt, or fresh beef, one pound and six ounces of soft bread, or flour, or one pound of hard bread, or one pound and four ounces of cornmeal, and to every one hundred rations fifteen pounds of beans, or peas, ten

pounds of rice, or hominy, ten pounds of green coffee or eight of roasted (or roasted and ground) coffee, or one pound and eight ounces of tea, fifteen pounds of sugar, four quarts of vinegar, one pound and four ounces of adamantine, or star candles, four pounds of soap, three pounds and twelve ounces of salt, four ounces of pepper, thirty pounds of potatoes, when practicable, and one quart of molasses.

The army ration is a good basis to figure from. The amount of supplies necessary for a given number of men, for a given time, will be found quite liberal enough to cover all the necessary waste of camp, after liberally supplying the table. It is not always well to make much allowance for prospective game and fish, for that is like the Indians say of the white man, "mighty uncertain;" have each separate article of provisions put up in sacks, made of good drilling; each sack should be provided with a strong string knotted at each end and sewed fast to the sack—loose strings disappear about camp like magic. This is the only way to keep provisions from getting mixed and wasted. Butter should be carried in tin cans; good butter can be procured in one pound cans, and will be found most convenient. It is better to pack the sacks of provision in a number of small boxes than a large one, where the transportation will be by railroad or wagon. Don't forget a few pounds of nails and spikes; also a few boards of light lumber can be put in the bottom of the wagon box. Shakes, or puncheons can be split out of spruce, or pine; but boards are best for making tables, cupboards, etc. With the material named, and a small amount of labor and a little ingenuity, a cozy camp can soon be arranged. All hands should devote one or two days fixing up camp and putting things in order. A well-arranged camp adds much to the pleasure of camping out. Don't waste any time making bunks, for without

mattresses they make a very cold bed. The ground is much better. First—With a hatchet cut off the stubs and roots and level the ground; then, for outlines for the beds, double or single, use poles at least six inches in diameter—one on each side—the full length of the bed; also one across at the head and one at the foot, then fill up the inside with small pine or spruce boughs; straw is better, if accessible. When using boughs, commence at the foot, with a course across eight or ten inches deep, then gradually shingle up to the head, keeping up the thickness; if properly done only the tip ends of the boughs will show, and if plenty is used the bed will be equal to a spring mattress; if on the ground, it will be quite warm, with a limited amount of blankets.

Hunting and fishing parties, usually in their eagerness to get to hunting or fishing, are apt to neglect the comforts of the camp; don't make this mistake. First, of all, put your camp in order that full enjoyment of the expedition may be realized, for you are just as apt to get game in sight of camp, in a game country, as by an all-day tramp in the woods. There is an old saying with the hunters, that the man that keeps camp usually kills the most game.



CAMP COOKING—HOW IT IS DONE.

If no cook is employed there should be one at least in the party who has had some experience in camp-cooking; however, plain cooking is quite easily learned. One of the most difficult problems about camp-cooking is to learn how to build and manage the fire. The backwall described, with a good fore-stick and small wood, is the best, provided the mania that average campers have for an immense fire can be controlled. Cooking cannot be done by a big fire with any satisfaction; a small, snugly-built fire is best, not only for cooking, but for warming purposes. The cooking kit should be well supplied with dish cloths, wiping towels, and soap; a yard or two of common muslin will also be found convenient for many purposes.

MAKING COFFEE.

The ordinary way of making coffee is to put a pot full of water over the fire until it boils, then add the ground coffee, about one handfull for each man, and one for the pot; set the pot back a little from the fire to prevent it from boiling too violently, as it will immediately boil over and waste the coffee. To prevent this, stir the coffee with a stick, or caseknife, until the grounds are thoroughly saturated with the water, when the inclination to boil over will cease. Coffee should be allowed to boil slowly fifteen or twenty minutes, when the addition of a little cold water will settle the grounds, then it is ready for the table. There is a stereotyped notion with most men that coffee should not be boiled. It is a grand mistake. The coloring matter can be soaked out of ground coffee, but clear and well-flavored coffee can only be made by boiling it, and it is the writer's firm belief that better coffee can be made in an open pot than in a closed one. Black tea, like coffee, should be boiled a short time. Green tea should be made by

infusion. Black tea is the most wholesome, and best for camp.

PREPARING AND FRYING FISH.

This is one of the most difficult branches of cookery. Fish of almost any kind, when properly prepared and cooked, are a luxury; but when otherwise, they are just the opposite, rather disgusting. In the first place, fish should be killed when first caught, then put in a basket and kept perfectly clean; what is better, roll them in a towel as they are caught and killed, so there will be a thickness of towel between each fish. No water should be permitted to touch the fish; then the fish, as they come from the water, are perfectly clean and don't require washing. If fish that require scaling, first wipe them with a dry towel and scrape off the scales with a caseknife; if you want to cook them with the heads on, remove the eyes and gills. For removing the entrails, from small fish, open on the belly; large fish on the back, and cut out the vent. The blood usually settles along the spine, but can easily be scraped off with the end of a caseknife, or the thumb nail; then, with a dry towel, thoroughly wipe them—the dryer the fish are the better. If spread out on a board, and a little salt sprinkled over them, and allowed to remain over night, all the better. To cook them, warm the proper amount of lard or bacon grease in a frying-pan, then lay the pan nearly full of fish, of a uniform size, salt and pepper to taste and fry over not too hot a fire; if the fish are quite dry they will cook done and will brown in a very short time, when they can be turned over nicely without tearing them all to pieces. To cook fish just from the water without time to dry them, they should be wiped dry and rolled in cornmeal, flour, or pulverized crackers; even then they will, in cooking, curl up in the pan and tear to pieces in turning them, and will re-

quire twice the time to cook. Venison, and all kinds of meats that are to be broiled, or fried, should not be touched with water. Meats can, and should, be kept clean without washing. In boiling meat of any kind, for stews, always have the water boiling hot when the meat is put in.

PORK AND BEANS.

There are few dishes in camp, or out, equal to a dish of well-cooked pork and beans. This is the way to do it: First, take the quantity of beans you desire to cook, say a quart, pick them over carefully and remove all the defective beans, sticks, and gravel, then wash thoroughly in clear water, pour off the water, and repeat until the beans are perfectly clean, then put them in a good sized camp-kettle with plenty of water, and hang over the fire; as they boil keep them supplied with water—hot water is the best. It is customary to boil the beans a while or parboil, as it is called, then pour off the water and fill up with fresh water; *don't do it*, if you desire to retain the full flavor of the beans. You might just as well parboil coffee and pour off and fill up with fresh water, and expect to have good coffee. Now you have the beans on the fire boiling, select a nice, fat piece of pork, or bacon, (pork is best) about equal in bulk to the beans; be liberal with the pork, and have it all fat; put the pork in another kettle with water and start it to boiling. After boiling a short time it will be necessary to skim it once or twice. It is quite necessary to put on the pork in a separate kettle, in order to have it quite done before putting them together. As soon as the beans have cooked until they are quite soft, which can be ascertained by squeezing one between the thumb and finger, or when the skin cracks and curls up; by this time the water on both pork and beans should be quite low, then put all together in one kettle, and allowed to cook until the pork is very tender or quite

soft. To be done right it will require several hours, and when done the water should be about all boiled out. The best way to finish the cooking, after the pork and beans have been put together, is to take a piece of muslin, a little larger than the top of the kettle, remove the lid and place the muslin over the top of the kettle, then force the lid back to its place; the rim of the lid that fits inside the kettle will carry the muslin in with it, making a tight joint. With a sharp knife trim the surplus muslin close to the kettle. Now, if the fireplace has been prepared as directed, you will have the excavation full of live coals and ashes. With the poker scrape out the coals and ashes until you have the hole deep enough to bury the kettle, set the kettle in quite level and cover it entirely with the hot ashes and coals, the muslin under the lid will prevent any dirt from getting in; let the kettle remain covered up six or eight hours; over night is better, the beans will not burn. If the directions have been carefully followed, in the morning you will have a dish fit for a king. The best way to warm cold beans to avoid burning them, is in a frying-pan over a slow fire. Venison, or any kind of game, is good prepared in the same way as the beans. Fill a kettle quite full of venison, grouse, rabbits, squirrels, or any kind of meat or game, be certain that the kettle is quite full, and don't forget to put in two or three good sized pieces of fat pork or bacon, then fill the kettle with water and put on the fire to boil, add pepper and salt to taste, then boil until quite tender, skim occasionally, if necessary. After the meat is done and the water nearly all boiled away, put on a piece of muslin, as with the beans, and bury the pot in hot ashes and coals and leave it in over night, then you will have a pot of the best baked meat for breakfast that you ever ate. There is absolutely no other way of cooking meat equal to this. Now, with what is left after breakfast, (unless you have quite a

large kettle) there will not be much left; but if there is any left you can have a splendid stew for dinner by adding a little water and a good supply of pared and quartered potatoes and a few onions, then cook over a slow fire until the potatoes are well done; this will require close watching, for if the fire is too hot it will scorch very quickly; the safest way is to surround the lower half of the kettle with hot ashes and coals. If this dish has been properly attended to four men will get away with a pile of it.

The best prepared bread for camping is very hard-baked rye bread, hard-tack, or Boston crackers. Soda crackers are no earthly good. Rye bread baked thoroughly brown all over will keep in a bag quite fresh, from ten days to two weeks, and it is a good, wholesome bread. However, camping parties should be provided with flour and some dry yeast. Good bread can be made in camp, but it requires more experience than any other kind of cooking. With the supply of flour there should be a few cakes of yeast, such as are sold by grocers, dissolve one small yeast cake with warm water, in a two-quart tin bucket, when the yeast is well dissolved add flour and warm water enough to fill the bucket one-half to two-thirds full of stiff batter; this should be well stirred with a spoon, then set the bucket near the fire until it fuments and fills the bucket, then fill one of the large pans about half full of flour; with the hand, shove the flour out to the edge of the pan, making a kind of nest, into this pour the contents of the bucket, then add warm water and flour, stir with a large spoon until you have a very stiff batter; by tempering with flour you can stir it until you can handle the dough with the hands; work it well until the dough is tough and smooth, and not too stiff. Now take the other dish pan, (the one that is about one inch smaller than the one you mixed the bread in) warm and grease it inside with a pork rind, then put the dough or loaf in the

pan, placing a piece of cloth over it and put in a warm place and let it raise; turn the pan around occasionally to warm the dough equally; as soon as the dough commences to raise it is ready to bake. In the meantime, the pan that was used to mix the bread should be cleaned and greased. Scrape out the hole in the fireplace quite deep and place in it the pan of dough, have it level, then turn the other pan upside down over the one in the ashes, and cover the whole with hot coals and ashes, cover quite deep and leave it about an hour and a half; when you take it out you will find you have a loaf of bread filling both pans, with a rich, brown crust. Don't become discouraged if the first trial is a partial failure; however, it will not be, provided your yeast and flour are good. In order to have the yeast ready for next baking, all that is necessary is to fill the two-quart tin pails with flour and warm water, with a little salt; there will be enough of the first yeast sticking to the pail to cause fomentation, without adding fresh yeast. If the fomentation is too rapid, and the yeast stands two or three days, it will get sour; then, in making bread, soda should be used, just enough to neutralize the acid. However, unless the weather is quite warm, good bread can be made of the yeast as prepared, without soda. Bread in this way is so wholesome that it will make a man hungry to smell it when warm. This same yeast, by adding flour and water sufficiently for a stiff batter, will make the proverbial "slap-jack," called by Californians "forty-niners;" they are unwholesome, and quite unfit to eat. With the reflector spoken of, biscuit, as well as good bread, can be baked in front of the fire more conveniently than by burying in the ashes. The reflector is also good for cooking all kinds of game and fish; in fact, the reflector is the best arrangement for out-door cooking that can be had. The best sauce for camp is pressed prunells; they are pressed into hard cakes;

they occupy but little space, and are easily prepared by adding sufficient water and sugar and stewing them over a very slow fire. They are quite tart, and for sauce, with any kind of game, are as good as cranberries.

In fitting out camp equipage where it is necessary to transport by pack-mule or burro, over mountain trails, it would be well to dispense with some of the cooking utensils, also the mess chest; in fact, all kinds of boxes, as they are heavy and quite inconvenient to pack on mules, unless there is an experienced packer in the party, or one who has had some experience in mountain hunting. For a pack-saddle the Mexican aparejo is the best, but for the totally inexperienced, the Indian or Government pack-saddle is the best. If regular paniers can be had, you will have the best possible arrangement. The Mexican panier is a strong willow basket, something like an office waste basket, but larger, with the side that is next to the pack-saddle flat, the remaining sides an oval, and larger at the top than bottom. Judging from memory, the bottom should be about 10 by 24 inches, the top 16 by 24 inches, and 20 inches deep. Two such baskets strapped together at the flat sides of the larger, or open ends, makes a set for one pack animal. The straps should be strong and buckled, that baskets can be adjusted the proper distance apart, to rest firmly on the pack-saddle, or aparejo. If regular basket paniers cannot be had, pouches made of leather or heavy canvass can be made, something like a very large pair of old-fashioned saddlebags. The pouches should be closed with a flap or cover, buckled down; either pouches or paniers are very convenient for packing on animals, and your traps are more easily managed than without them. To put a pack-saddle or an aparejo on a mule properly, thereby preventing sores on his back, is the great secret in successful packing. Much depends upon fitting on the saddle and having the load

about equally balanced. To saddle the pack-animal first put on the saddle-blanket; over this there is no objection to putting one of the camp blankets; the blankets should extend well down the animal's side, then put on the saddle or aparejo, put on the crupper and adjust the saddle in the proper position, then run one hand under the blankets, on the animal's withers, and raise up the blankets clear of the animal's backbone, then cincho very tight. A cincho is the broad band used to fasten the pack-saddle; it goes entirely around the saddle, as well as the animal. On the ends of the cincho are large rings; to one of the rings is fastened a long leather strap called a latago. This strap should be wreathed through both rings, like a tackle block, which gives a good purchase. It requires the strength of two men to cincho a pack-saddle properly. The animal will "hump his back" and make some fuss, but no difference, it must be "cinchoed" tight for the animal's good, for if the saddle is loose it will soon chafe sores on his back. When paniers or pouches are used, blankets can be folded up in square packages and piled on top the paniers; if you have no paniers or pouches everything but blankets should be put in strong bags, each separate article of provision in small bags; then put into two large bags. These, when packed, should be about equal in weight. Hang the two bags together with a sling rope, one on each side, in the proper position quite high up on the animal's side, pack blankets on top of all; then the whole business is fastened on with a long rope, generally a raw-hide one, called a lash rope. Lashing on the pack is the most difficult part of packing, yet quite simple to experienced packers. Here is a description of how it is done, but it is almost impossible to make it intelligible in writing: The lash-rope (only one to an animal) should be about twenty-five feet long, twisted or braided raw-hide is best, about five-eighths of an inch in diameter; on one end of

the lash-rope should be fastened to a short wide cincho, to the other end of cincho a stubby wooden hook, made of the forked limb of any tough wood; it requires a man on each side of the pack to do the lashing. The man on the near side of the animal takes the lash-rope and throws the end that has no hook on out to the rear of the animal on the ground. See that is well stretched out without kinks, draw the rope over the pack lengthwise—that is from tail toward head of the animal—throw the cincho or hook end under the animal's belly, for the man on the other side; then cast over the pack the rope doubled, the doubled part must go over the part of the rope laying on the pack, the opposite man must hook the loop end of the double rope on the wooden hook, then the part of the long end of the rope laid the length of the pack; that is, the left hand rope must be thrown around the right corner of the pack, over to the right, passed back under the rope around the animal and around the left corner of the load, then the long end of the rope should be cast in a loop over the opposite side of the pack, pass the end under the left hand rope; that is, over or across the pack, then everything is ready for drawing up. The man on the off side must draw the rope through the cincho, hook as tight as he can; the man on the near side takes up the slack and follows it around the pack, drawing the rope tight as he goes, then fasten the end by tucking two or three times. If properly put on, the two ropes across the pack will form a diamond on top the pack. The short sides of the diamond will be drawn front and rear of the center of the pack, by the rope as it was placed. This description would be quite clear to a man after he sees the thing done, but whether from the description a man could do it, is another thing. The writer has attempted to make it quite plain, but finds it very difficult to do. Unless the pack is well lashed on it will be a source of trouble continu-

ally, and will have a tendency to make sores on the animal's back. Two good pack mules can carry a sufficient camp outfit for four men, including blankets, provision, cooking utensils, tent, etc., for a ten days' or two weeks' trip; however, in this case, game and fish must be looked after. If saddle horses are used by the party each man can carry on his horse, lashed to the saddle, quite a portion of the equipment, especially blankets. Pack mules will carry from two to three hundred pounds from twelve to fifteen miles each day, over mountain trails with ease. With an experienced man as packer, and to look after the horses, a party of four or five could have a jolly time in any of the mountains of the western territories, especially on the Pacific slope, where game and trout abound in almost unlimited numbers.

The large game of the west is fast disappearing at the hands of the skin hunters. The writer spent from the 15th of last July to October 1st, in the territories of Montana, Wyoming, Idaho and Washington without even seeing any fresh buffalo signs, but was told that a few mountain bison were still high up in the mountains of the Yellowstone Park. Bear, deer and elk are yet quite plenty. Antelope are quite scarce, compared to a few years ago, but the mountain streams are swarming with trout, and will be for years, as many of them will be rarely visited by any but the boldest mountaineers.

For mountain travel there is no way equal to saddle horses and pack-mules; the baggage need only be limited by the number of pack animals. The intelligence of a well conditioned pack-mule is phenomenal; a source of continual interesting enjoyment to watch their ingenious maneuvers in climbing rugged places, fallen timber, and tangled thickets. For saddle, as well as pack animals, mules are better than horses; they are surer-footed, hardier, require less care, and will carry a man safely where a horse would

fail. However, it is well to have one horse in the party; the mules, from some unaccountable reason, will become attached to a horse that they are permitted to associate with. This is quite convenient, as when in camp all that is necessary to keep the mules in the vicinity is to hobble the horse by strapping his fore feet together about seventeen or eighteen inches apart. A regular hobble is a short piece of chain, a ring at each end; also straps and buckles. Buckle a strap around each fore leg, between hoof and fetlock, the chain connecting the two; the horse will soon learn to get around sufficient to procure all the food necessary. Don't be uneasy about the mules, they will under no circumstance leave the horse very far. It is not necessary to carry feed for the animals; if camps are properly selected there will always be quite sufficient grass and browse for any number of animals, turned loose as directed.

There are many advantages in this way of traveling, probably the most important is the perfect freedom and independence, go where and when you please, and not necessarily confined to trails or roads, but can make excursions to unfrequented points of interest that would be absolutely impossible to reach in any other way. It is the only satisfactory way to do the National Park. Of course, progress is slower, but much more satisfactory; besides, time spent in mountain excursions, like the chase, "is not counted in the length of life." This is another case where a man should not begrudge the time. From twelve to fifteen miles a day is all that should be required of a full-laden pack animal; this distance can be made in from four to six hours easily. If only about this distance is habitually traveled the animals soon understand it and will endeavor to make the distance in the least possible time; they will require no urging. But, on the contrary, if irregularity is practiced as to distance and number of hours on the road, the animals will become indiffer-

ent lazy and stubborn, and will require constant urging; in fact, three times the labor to make the same distance as it would where regularity of distance was adhered to by making regular distances of from twelve to fifteen miles; very early starts are unnecessary, the distance can be made and give ample time to fix up camp before dark. By going into camp early, the animals will have plenty of time to feed and at night lie down and rest. They will again in the morning have time to feed while you are leisurely getting breakfast and striking camp. An animal properly managed and properly packed, will neither get a sore back, nor poor in flesh. The most economical way for a party to make a mountain tour of a few weeks, or months, is to purchase outright the whole outfit of pack and saddle animal. If a party of four, it pays to hire an experienced packer to look after the animals and attend to the packing; one that understands the business would also be a good mountaineer—all the guide necessary to have. The animals and outfit by judicious management, at the end of the trip will bring all they cost, or nearly so. It will be found very much cheaper than to hire the outfit by the day. For the northern territories the native horse, called cayouse, is tough, sure-footed, an excellent climber, and usually of a good disposition, fully equal to the mule for riding or packing. But for California, Texas and Mexico, the mule is preferable to the mustang or lower country horse, both for riding and packing. As a rule, mules are more tractable; they soon form attachment to persons, as well as things. The only attachment that will keep the average mustang within bounds is a good, strong picket-rope, well staked.

In selecting an outfit of saddle and pack animals, it is well not to be in too great a hurry. Try the animals under the saddle, note their dispositions, also try the pack animals with packs on; it will pay to take time to select animals of

good dispositions and well broken; that have no bad habits, such as kicking and bucking. See that they have sound backs and that their tails are not crupper-sore. Don't reject a mule on the account of a big belly; if everything else is all right, big bellied mules are the kind to stay with you through thick and thin. For a riding saddle, select the best of the California pattern with the fewest trappings; by using the kind that has two cinchos, the crupper can be dispensed with. A few days spent in the vicinity of the starting point will be well spent; in fact, it is the only way that a perfect outfit can be secured. Two or three days will be ample time. Learn just what is necessary, as well as what is unnecessary, then be governed accordingly.

MEDICAL DEPARTMENT.

Camping parties should have a limited supply of simple remedies, such as tincture of aconite and quinine for fevers, a bottle of camphor and a bottle of whisky, also some good liniment, a roll of mustard plaster and some adhesive plaster and a roll of bandages; also a good diarrhœa mixture; but it is best to consult a physician. However, the above will be found all that is necessary. Fevers brought on by exposure and over-exertion can be corrected by a few doses of tincture of aconite, followed by a few doses of quinine. Aconite is a virulent poison, and must be taken in small quantities; three drops as a dose, every hour, for a few hours, will usually reduce ordinary fevers, then take three or four 3-grain quinine pills, two hours apart. The bottle of whisky mentioned is strictly for medicinal purposes, and must be kept for emergencies.

If a supply of whisky is taken along to be used as a beverage, don't in any event drink in the morning before breakfast. One drink in the morning will do more damage than a half dozen will repair afterward. "Don't forget it."

Camping parties are really better with no whisky except that which is strictly for medicine. To parties that insist on having a supply for drinking purposes, take the advice of an old campaigner, and do all the drinking in the afternoon and evening.

FISHING WITH HOOK AND LINE.

The subject of fishing has been fully written up over and over by many good writers—fly fishing, especially. Theory after theory has been advanced, all kinds of signs taken into account, the wind, weather, etc.

Often, luck comes in for a large share, or some great secret is connected with the art. This brings to memory a story in *Campfire Flickering*, published in the *Forest and Stream*, of a man that was noted for his success as a fisherman. So much so that the opinion that there was some great secret connected with it, or known to him, had become general. A member of a fishing party one day, thinking to get some advantage over others of the party, thought he would possess himself of the secret by a slick species of bribery. He called the noted lucky fisherman to one side, slipped a five dollar bill in his hand, and slyly asked him the secret of his success. The old man pulled his head down and solemnly whispered in his ear, "When you get a bite, jerk." The art of fishing can not be learned from books no more than watch making.

To be a successful fisherman requires patient perseverance, industry and devotion. Fish are frightened more by moving objects than anything else. The habits of fish and the likely places to find them can only be learned by observation and study. Find the likely places, move about cautiously, keep out of sight as much as possible, then, "when you get a bite, jerk."

HOW TO PRESERVE FRESH FISH IN WARM WEATHER.

A simple and effectual mode of preparing fresh trout, or any other kind of fish so they can be preserved, perfectly fresh and good, for from seven to ten days, at any time of the year, and in almost any climate.

Trout, as well as other fish, should be killed as soon as caught, and never be permitted to again touch water; fish will keep longer, and retain their flavor better, than by attempting to keep them alive in the water, or permitting them to die out of the water.

To prepare trout, kill them as soon as they are caught, keeping them in a clean basket, box, or creel, and free from water. When you have caught a sufficient quantity to make a package, prepare them as follows: With a dry towel or cloth, wipe them clean and dry, open them on the belly for the purpose of removing the entrails; then with the thumb, or a round bladed knife, scrape the blood from the back bone, then remove the gills, also the eyes, as the fluid from the eyes would give the fish an unpleasant flavor; now, again wipe them dry; the more thoroughly this is done, the better they will keep; then, from the inside, split the fish through the backbone to the skin on the back, then sprinkle salt over the open fish and rub it well in, using just enough to properly season the fish when cooked, close the sides together so the fish will look natural, then spread them over night on a dry log or board for the purpose of cooling. The nights where trout are usually caught are cool,—sufficiently so for this purpose: In the morning, before sunrise, carefully fold the fish in dry towels, in rows, distributed in such a manner that there will be a fold of the towel between each fish; this must be done with care, then carefully wrap the whole package snugly in a piece of muslin, then with a coarse needle and thread, sew the package close and tight; wrap again in a piece of woolen

blanket, or a whole one is better, and sew the ends and sides, being certain to have sufficient coverings of cloth and woolens, now put the roll in a stout paper bag, such as is used for flour, then tie tightly, and the thing is done.

Fish in this manner can be sent from Maine to New Orleans, even in August, and preserved fresh and nice. The more care bestowed in preparing them, the better they will keep. The fleshy parts of venison can be preserved in the same way.

Fishing and hunting parties desiring to send fish or game to distant friends, in warm weather, can do it in this way with perfect assurance that they will arrive sweet and wholesome, if they have been careful in preparing them.



MISCELLANEOUS RECIPES.

VARNISH FOR JOINTED RODS.

Dissolve in pure alcohol, a sufficient quantity of the best orange shellac, to give the mixture a consistency of thin varnish, apply with a piece of woollen cloth, first putting a little linseed oil on the cloth with your finger, then quite a dab of varnish, with this rub briskly to a polish. Just enough oil should be used to prevent the varnish from becoming sticky. Five or six coats is not too much, then with a small brush, give the wrapping an extra coat; for the wrappings, coach varnish is the best. In this manner go over your rods once or twice each season, and they will always look new. Always keep a small bottle of varnish with your tackle; each time the rod is used the wrappings will be the better if a little varnish is used.

The shellac varnish is the best for gun stocks, rubbed on in the same way as on your rod, it is also good to prevent the rusting of the barrels and trimmings when shooting on salt water.

TO COLOR FISH LINES, AND GUT LEADERS, NEUTRAL TINTS.

Soak them over night in green tea, or coffee, or a solution of indigo. For gut leaders, Arnold's ink, with a little vinegar added, is the best; allow them to remain over night in it.

LOTION AND PREVENTATIVE FOR MOSQUITO AND GNAT BITES.

Oil of pennyroyal, four ounces; olive oil, eight ounces; pine tar, two ounces; mix well and apply until a good coating of varnish is established.

ANOTHER.

Olive oil, two ounces; tinct. camphor, two drachms; carbolic acid, one drachm; acetic acid, one-half drachm; oil

of cedar, one drachm; oil of pennyroyal, one drachm. Mix, and apply, as with the first.

Another, is to wash with strong carbolic soap, and dry without wiping.

WATER PROOFING FOR LEATHER BOOTS—DON'T LOOK FOR ANY OTHER.

Boiled linseed oil with a very little lamp black; apply a coat each morning for several days, and after, as often as is required; this will make leather as near water proof as is possible.

DOGS.

ANTIDOTE FOR STRYCHNIA POISONING.

Camphor gum is all that is necessary. A lump of camphor gum, the size of the end of your thumb, shoved down the dog's throat will cure him even after he has had spasms. This is reliable.

CURE FOR DISTEMPER.

Give three drops of the tincture of aconite root every hour, for from six to ten hours. After the fever is clearly reduced, give three quinine pills, of three grains each, giving one every two hours, until the pills are all taken. If the dog's bowels are free, this is all that is necessary. The best way to give the aconite is, drop three drops on a small piece of raw meat, if the dog will eat, if not, drop it on his tongue, and be careful to give him not more than three drops, for this remedy is a very active poison, and an overdose would speedily prove fatal.

TO CLEAR A DOG KENNEL FROM FLEAS.

Sprinkle the straw, or bedding with dilute carbolic acid, and a good way to kill them on a dog is, take one part of

carbolic acid, and thirty parts of water, wash the dog thoroughly once a week, for four weeks. This will surely kill them; and used in the same manner and for the same length of time, will cure mange, and almost any skin disease that dogs are heir to.

CURE FOR CANKER OF THE EAR, EXTERNAL OR INTERNAL.

If internal, clean out the ear by filling it with warm suds, made with carbolic soap, knead the ear well with the hands, then with a quill or small bellows, blow the ear full of pulverized Iodoform. If external, after cleaning the ear with carbolic soap, sprinkle on the sore the same remedy you used in the internal case. If there is not an absolute cancer, this will effect a cure.

Observations of the Weather, Through the Lunations of the Moon.—(Herschell.)

“The nearer the time of the moon’s change, first quarter, full, and last quarter, are to *midnight*, the fairer will be the weather for the following seven days; the range is from ten at night to two next morning. The nearer midday, or noon, the phases happen, the more foul, or wet, the weather may be expected during the following seven days, the range for this calculation is from ten in the forenoon, until two in the afternoon.

“These observations refer principally to the summer, though the spring and autumn are nearly in the same ratio.”

SNOODING HOOKS.

The following letter, signed Californian, and published in the *Forest and Stream* February, 1885, covers the whole ground, and as the writer of this book and Californian is the same individual, it is here reproduced in full:

SNELL, SNOOD, GIMP.

If the inquirers through the *Forest and Stream* will try the following plan for fastening snells to hooks they will never have occasion to complain of them slipping off:

Get a roll of rubber cement such as is used to fasten bicycle tires, (it can be procured where bicycles are sold) warm the shank of the hook in a lamp sufficient to melt the cement, then draw the shank of the hook across a piece of the cement and enough will adhere to answer the purpose. Let it cool for a second to prevent it from sticking to the fingers, then press the end of the snell on in just the position you wish it to remain. After allowing the cement to stiffen a little more wrap with good thread, and if you have just the proper quantity of cement and the right consistency the wrapping thread will bury into the cement smoothly; it will be perfectly waterproof and stick to the business under all circumstances. The cement also answers well to waterproof thread or cord for wrapping; use as you would cobbler's wax.

The best way to snood hooks with silkworm gut is, instead of fastening the gut directly to the hook, to fasten a small loop of relaid linen line No. 5 to the hook as directed for snell. The loop should be quite small, not over one-eighth of an inch. Then prepare the gut by tying a loop at each end, one for attaching the hook through the small loop on hook, the other for attaching the line. Many advantages are gained by this method, the gut is double near the hook, it also forms a flexible joint and avoids the annoyance of chafing or breaking off by being bent short; in case a hook is broken another can be easily attached to the same gut. Hooks and gut can be carried separately and attached when required for use. If flies were tied in the same manner many anglers would find fewer occasions to lose their religion by having their flies break off where the gut joins the hook.

Canoeists will find this rubber cement excellent for stopping leaks in canoes, either joint-cracks or holes; quite large holes can be fixed up with it. For cracks or joints, with a hot iron or small stone, melt and rub the cement well in, leave a small streak of the cement over the crack or joint. For mending a hole take a piece of canvas or boot leg large enough to cover the hole with about one inch lap all around. With a hot iron or stone smear over the patch with a good coat of rubber cement, also smear around the edges of the hole, then heat the patch quite hot and press it in place. Then smear over the whole business with cement, using the hot iron or stone. The cement will harden in a short time, when it will require no further looking after. This, of course, is only for cases of emergency. To fix a hole permanently it should be cut out square or oblong with slightly beveling edges, then neatly fit a piece of wood to the hole, smear the edges of the piece as well as the edges of the hole with rubber cement; have it quite warm, then press the piece in place; if well done it will neither come out nor leak. No canoeist's or angler's kit is complete without a roll of rubber cement. It is *multum in parvo*; try it.

Instant Relief for Cramp or Wind Colic.

The severest cramp colic can be cured by simply standing on the head for a few seconds. This is an Indian cure, and a good one.

Standing on the head can be easily accomplished by putting your head and hands on the ground at the butt of a tree, throw the body and legs against the trunk of the tree. By the assistance of a companion it is quite easy done; a few seconds is all that is necessary.

THE SIZES OF OUR GREAT LAKES.

The latest measurements of our fresh water seas, are as follows:

Lakes	Greatest Length.	Breadth.	Mean Depth.	Area
Michigan	300 Miles.	108 miles.	690 feet.	23,000 miles
Huron.....	200 "	169 "	600 "	20,000 "
Erie.....	250 "	80 "	84 "	6,000 "
Ontario.....	180 "	65 "	500 "	6,000 "
Superior.....	335 "	160 "	688 "	82,000 "

The five lakes covering an area of over 135,000 square miles.

GOOD STRONG GLUE WATERPROOF.

Alcohol, (spirit of wine) 1 pint; sandarac, 1 ounce; mastic, 1 ounce; common white turpentine, 1 ounce; glue and isinglass, sufficient; water, sufficient. Dissolve the two resins—sandarac and mastic—in the spirit, and then add the turpentine to the solution. Make some very strong glue, and add to it a good pinch of isinglass. Now heat the alcoholic varnish until the liquid begins to boil, and then very slowly stir in the warm glue. The amount of the liquid glue to be added is determined by noting the point at which, after thorough mixture, a magma or a thin paste is formed capable of being easily strained through cloth. When required for use, the strained mixture is to be warmed and applied like ordinary glue to the articles to be united. A strong junction is effected, which is not destroyed by cold water, and only after a comparatively considerable time, by hot water or ordinary saline solutions.—*British Journal of Photography.*

ETHER GLUE.

An excellent liquid glue is made by dissolving glue in nitric ether. The ether will only dissolve a certain amount of glue, consequently the solution cannot be made too thick. The glue thus made is about the consistency of molasses, and is doubly as tenacious as that made with hot water. If a few bits of india rubber, cut into scraps the size of buck-shot, be added, and the solution be allowed to stand a few days, being stirred frequently, it will be all the better, and will resist the dampness twice as well as glue made with water.

GLYCERIN CEMENT.

A cement, said to be capable of use where resistance to the action of both water and heat is required, is composed

by mixing ordinary glycerin with dry litharge, so as to constitute a tough paste. For uniting the joints of steam pipes and other similar applications, this preparation is said to be very satisfactory.

WEIGHT OF AIR AND WATER.

One cubic foot of air weighs 523 grains. One cubic inch of water weighs .03617 lbs. One cubic foot of water weighs 62½ lbs. One cubic foot of ice weighs 58½ lbs. One cylindrical inch of water weighs .02842 lbs. One cylindrical foot of water weighs 49.1 lbs.

RUBBER BOOTS

can be patched as follows: Rub the patch and boot thoroughly with sharp sand paper. Smear both with liquid rubber five times, every time letting them dry. Do this once more, and, before they dry, apply the patch, with pressure, if possible, and the boot is mended. If liquid rubber is not obtainable, dissolve small pieces of rubber, not vulcanized, in warm spirits of turpentine to the consistence of molasses in summer.

RELIABLE RECIPES.

For corns, easy shoes; for bile, exercise; for rheumatism, new flannel and patience; for gout, toast and water; for the toothache, a dentist; for debt, industry; and for love, matrimony.

TO KEEP GUM ARABIC FROM MOLDING.

Solutions of gum arabic soon mold and sour, and finally lose their adhesive property. It is said that sulphate of quinine will prevent this, while it imparts no bad odor of its own. The addition of a solution of a few crystals of this salt to gum arabic will prevent the formation of mold quite as effectually as carbolic acid, and by analogy it is safe to suppose that the same salt could be used in writing ink, mucilage, and possibly glue.

BROWN TINT FOR IRON AND STEEL.

Dissolve in four parts of water, two parts of crystallized chloride of iron, two parts of chloride of antimony and one part of gallic acid, and apply the solution with a sponge or cloth to the article, and dry it in the air. Repeat this any number of times, according to the depth of color which it is desired to produce. Wash with water and dry, and finally rub the articles over with boiled linseed oil. The metal thus receives a brown tint and resists moisture. The chloride of antimony should be as little acid as possible.

TO TAN SMALL SKINS.

When taken from the animal, let the skins be nailed in the shape of an oblong square on a board to dry, fur side down. Before taking them from the board, clean off all the fat or oily matter with a dull knife. Be careful not to cut the skins. When you wish to tan them, soak thoroughly in cold water until soft; then squeeze out the water, and take of soft water three quarts, salt half a pint, and best oil vit-roil one ounce. Stir well with a stick, and put in the skins quickly, and leave them in thirty minutes. Then take them in your hands and squeeze (not wring) them out, and hang in the shade, fur side down, to dry. If you get the quantity of liquor proportioned to the skins, they will need no rubbing to make them soft; and, tanned in this way, the moths will never disturb them.

BUFFALO ROBES.

These are not, strictly speaking, leather, as they are prepared without the use of bark or tannin in any form. They are simply a raw hide made soft and pliable by manipulation and the use of grease or oil. The Indian process, in principle, is the same we use in making our soft leathers, chamois, buckskin, lash or string leather, etc. The Indian women, in making buffalo robes, first "flesh" and pare down

the green hide with a bone, toothed something like a saw, and knives. They then cover it on the flesh side with the brains, blood, liver, grease and the contents of the gall bladder of the buffalo or elk. This is thoroughly worked in near a fire or in the sun. They then, after the hide is partially dried, work it over a beam or rope until it becomes soft and flexible. They sometimes make a species of leather by taking off the wool by the use of lime, and then preparing it as above, smoking it thoroughly. The hide of the buffalo is covered, not with hair, but with a true wool, which has the property of felting or fulling, and out of which cloth can be manufactured.

CEMENT FOR LEATHER.

Ten parts of carbon bisulphide and one part oil of turpentine are mixed, and as much gutta percha added as will readily dissolve. The surfaces of leather must be freed, with a hot iron, from fat, and the parts once joined should be well pressed until they are firmly united.



HOW TO SKIN BIRDS.

For the following very instructive and-interesting article on skinning and preparing bird skins for mounted specimens, I am indebted to Prof. Oliver Davie, a leading taxidermist of Columbus, Ohio, also author of the "*Naturalist's Manual*," and "*Egg Check List of North American Birds*." It will undoubtedly prove very beneficial to many sportsmen who desire to preserve specimens as trophies of their skill and sports:

COLUMBUS, OHIO.

"Many a rare bird has come to the hands of the naturalist that would otherwise have been lost and perhaps never recorded, in a particular locality, were it not for the sportsman, and nearly every person who has handled a gun has, in the course of his experience, taken specimens that for their beauty or rarity, and also as trophies of a day's hunt, would like to preserve them for future inspection by themselves and friends.

To be able to skin and prepare a bird for mounting in a proper manner is an accomplishment which few sportsmen have acquired. It is, however, very simple, and with a little patience and care can easily be done, and with this end in view, I will make my directions as clear as possible, and tell how to skin a bird.

In the first place, we need something in the way of a preservative to put on the skin. Common dry arsenic is the article most generally used because it is the most convenient, and when pure, and properly applied, it certainly is a good thing. Arsenical soap is also used and is better in many respects, but is not so convenient.

It is a well known fact that arsenic in the form of a powder is very injurious to the health. Many a taxidermist has met with serious results after long and constant use of

dry arsenic which leaves its effects by being inhaled while dusting it on skins. This however, would not be the case with a person who would only occasionally find use for it. Furthermore, the common dry, powdered arsenic that is usually sold at the apothecary shops is of such an inferior quality—rendered so by adulteration—that its effects as a preservative are of little consequence, and dry arsenic, no matter how pure, has not the penetrating powers as something of a similar nature in a liquid form. I therefore introduce a new Arsenical Solution which is a most powerful and effectual preservative, although it is not any more convenient than arsenical soap. I give it here for those who may desire to use it. It can be applied to the skin of birds and mammals in various ways with the most gratifying results, and while the principal ingredient of this solution is pure crystallized arsenic it is not injurious to the health, as is the dry pulverized arsenic. It is made as follows: Take one pound of crystallized arsenic and one-half pound of bicarbonate of soda, add to this five pints of water; boil the whole down to *three pints* over a slow fire—stirring frequently to prevent the arsenic and soda from settling to the bottom. It is a good idea to first break the large pieces of arsenic in order that they may quickly dissolve. When cold it is ready for use. By mixing a quantity of Spanish whiting with a small amount of the liquid until it forms a very thin paste, it is ready to be applied to skins by the use of a brush.

Now, as we have the preservative before us, the next procedure is to skin the bird. In removing the skin from a bird, the body, if fat or bloody, should be dusted with cornmeal, as this prevents the plumage from becoming soiled. The knife used should be sharp, especially toward the point, and a pair of scissors are very convenient, although not altogether essential.

Fill the mouth and nostrils with cotton in order to

prevent liquids or juices escaping and soiling the feathers. Now, lay the specimen on its back and separate the feathers. They will open along the abdomen where a bare strip of skin can be seen from the breast to the tail. Hold the feathers thus separated with the thumb and finger of the left hand, and make an incision along the middle line of the abdomen, almost from the top of the breast bone full to the vent. Take hold of the cut edge of the skin and press the flesh of the abdomen down from it with the side of the knife. Never pull on the skin, but press the flesh away from it. Carefully raise each side of the skin as far as the legs. Bend the knee joints up through the opening and cut them off. Skin the legs, scraping the flesh from the bones, but leaving the bone of each leg in place. Loosen the skin as far down toward the back as possible. Now stand the specimen up on its breast and bend the tail down toward the back. Cut it off at the joint very slowly, cutting only a little at a time to make sure that it is flesh and not skin you are severing. You are also to be careful not to cut through the quills of the tail feathers; if cut they will often drop out.

The bird may now be hung head downward, by a hook inserted in the exposed stump of the rump; and with a little care, the skin may be gradually stripped off as far as the wings; the wings are to be severed from the body, inside the skin, at the shoulder joint. At this stage, the wings themselves are to be separately skinned; detaching the secondaries from the ulna; *scraping* the bones *thoroughly* and removing the humerus or single bone of the wing entirely. This method of skinning the wing is only applied to *small* birds. *Always* leave *all* but the head of the humerus in good-sized birds. *Never* detach the secondaries from the ulna in birds the size of Cooper's Hawk and upwards, for in order to do good work on a large bird if it should ever be mounted, the secondaries *must be attached* to the bone. Especially is this

the case where the bird is to have the wings spread. When the secondaries are detached *it is impossible* to give them the even and regular spread that they have in nature.

The muscles and tendons can be removed by making a cut on the under side of the wing, from the elbow to the wrist; this cut can afterwards be neatly sewed up and the feathers will fall smoothly to their place and cover the seam. As soon as the wings have been severed, the skin, which by this time will have been turned inside out, will easily slip along the neck as far as the head. To skin the latter is the most difficult part of the job, and must be carefully done or the skin will tear.

The head should be skinned *close down* to the base of the beak, *especially* in *front* of the eyes. The eyes are to be picked out, and the triangular portion of the skull, together



Skin Ready for Re-turning.

with the flesh between the jaws and the brain is to be removed, leaving the sides and top of the skull attached to the bill. The skin above the eyes and ears is closely adherent by membrane to the bone and must be detached with great care.

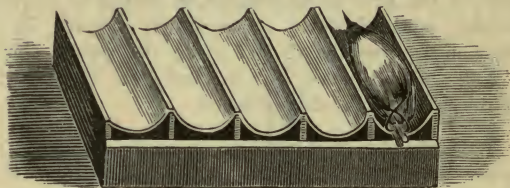
In the general process of skinning after the first incision, little if any use of the knife or scalpel is required, except to sever the legs, tail and wings, to work about the eyes and ears, and to remove the base of the skull. The cutting may be better done with the scissors than with the knife. The skins of most birds slip off very easily and can usually be detached with the thumb nail. In the cases of Woodpeckers some Ducks and a few other birds, the heads of which are too large in proportion to the caliber of the neck to be skinned as heretofore directed, this part must afterward be separately skinned by an incision made from the outside along the middle line of the skull. This is done after the body has been severed from the skull and the skin returned.

If the above process has been properly conducted the skin has been turned inside out. The arsenic may now be applied to *every part* of the skin. Especially the head, wings, legs and tail should be heavily coated with it. The arsenical solution which I have recommended elsewhere in this chapter will take the place of arsenical soap in aiding the skin to slip easily over the head.

Now fill the eye-sockets with pellets of cotton the size of the bird's eye and the skin is ready to be turned right side out. *Never* "bung out" a bird's eyes by putting too much cotton in the sockets or orbits. Be *particularly careful* about this in Hawks and Eagles, who have deep set eyes, which should be pressed inward rather than distended.

After the skin has been turned right side out and the feathers of the head, neck and wings are nicely adjusted, the wing-bones of opposite sides should be tied with thread *inside* the skin as near together as the back of the natural body of the bird is broad.

Fill the neck with a strip of loose cotton, pushing it up into the mouth with a slender stick or spring forceps. Fill the rest of the skin with the same material, but if the bird is a large one common tow is always best for a filling. Now, smooth the feathers over the opening and place a narrow band of paper around the bird or place the bird in a drying-board like the accompanying cut which is made by



DRYING-BOARD.

tacking heavy paper on a board. There are several methods of sewing the wings to the skin which are unnecessary to give here, as the skins made by the sportsman will probably be mounted before they are many weeks old, and if the skin is

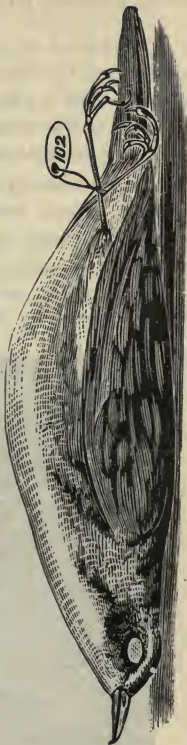
nicely adjusted in the paper belt or drying-board it will answer all purposes. The name of the bird, sex and locality and date of capture should be recorded on the slip of paper. When dry, it can be dropped head foremost into a paper cone, and the end folded over and pinned.

This is what is technically called a "skin," and is the only practical way to preserve birds while on an excursion.

Hundreds of skins will occupy but a comparatively small amount of space, and they can be "wet up" and mounted at any time.

When it is desired to ship birds in the flesh they should have the mouth, nostrils and vent tightly filled with cotton to keep the feathers from becoming soiled by any of the juices that are liable to escape.

It is impossible to ship birds in the flesh in warm weather without taking the entrails out and then saturating the inside and the throat well with carbolic acid. All specimens shipped in this way should be carefully wrapped in paper, placed in a box and marked "Perishable," and in all cases shipped by express.



SKIN PROPERLY MADE.

How to Remove and Preserve the Skins of Animals.

A sportsman may at sometime, be desirous of having a large or small animal mounted and yet not know how to proceed to skin it properly for the purpose. For this reason I give the following simple directions, which, if followed closely, will bring about satisfactory results:

The first opening cut should be made along the under side of the animal from the throat to the base of the tail. Do not cut through the lips or vent. The tail must be slit open along the under side about an inch or two, according to the size of the animal, above the root all the way to the tip, as shown by the dotted lines in Fig. 1.

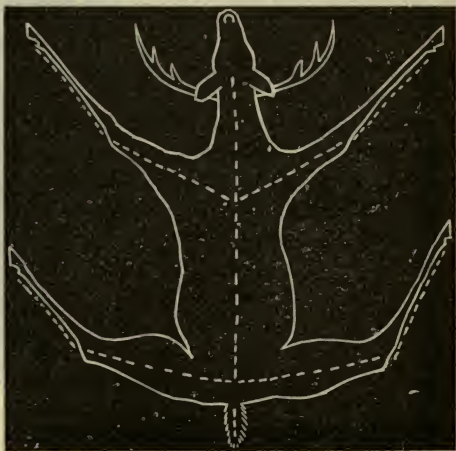


FIG. 1.

The dotted lines show where large animals must be slit open for the purpose of skinning.

Begin at the center cut and slit the legs down as far as the knee joint in the fore legs, and down to the hock joint in the hind legs. Now make a slight turn and continue the cut down the back part of the leg to the foot, as shown by the dotted lines in Fig. 1. These are all the opening cuts that are necessary to skin a large animal, except when it has horns. It is then necessary to make an opening at the back of the neck and cut completely *around* the *base* of the horns as shown by the dotted lines in Fig. 3.

Lift the skin, beginning at the middle of the abdomen, and cut it neatly from the carcass, leaving little or no flesh adhering to it. Detach the skin as much as possible from the legs and continue skinning until you come to where the fore leg joins the body at the shoulder and the hind leg at the hip. Cut through the muscles of the shoulder and hip and thereby detach the legs entirely from the body. You have now severed the legs from the carcass and they lie before you. Cut all the flesh and tendons from them, but *leave* the bones *attached to each other* by their natural ligaments. The next thing to do in large animals is, to cut the leg bones off at the first joint above the foot, at the lower end of what is called the sesamoid bone. They should now be tied in a bundle and *always* shipped with the skin.

Never throw away the leg bones of any animal which you intend to have mounted. A taxidermist must have the leg bones and skull in order to do accurate work. Detach the skin down the back to the neck and cut the ears off close to the head and skin as much of them as possible. Continue until you come to the eyes. Be very careful here or you will cut through the eye lids. Cut slowly and keep as close to the socket as you can. You will now notice a thin membrane; through this, cut and continue to skin down to the nose, cutting through the cartilage of the nose close to

the bone. Both lips must be cut away close to the bone and detached entirely from the skull.

The skin is now entirely off the animal, and every particle of flesh adhering to it should be thoroughly cut or scraped off. The lips are very thick and fleshy and should be split from the inside and the flesh cut away. Great care should be exercised or you will cut pieces out of the skin, and especially is this the case with the face around the lips which, by the way, is the worst place to disfigure an animal. Do not cut so deep that you will cut into the roots of the whiskers and cause them to come out.

The skin is now ready to be put into "pickle." (See "Preservation of Skins.")

Sever the skull from the body, clean it thoroughly and draw out the brain through the occipital opening at the back of the skull. This can be done with a long spoon handle bent up at the end, or wire flattened at the end, and bent in the same manner.

The above directions are only applied to large quadrupeds, like those of the bear, deer, antelope, elk, moose, mountain sheep, etc.

TO SKIN SMALL ANIMALS.

The only difference in the skinning of a small animal and a large one is, that the skin of the legs is not slit open. It is only necessary to slit the skin open along the abdomen, beginning at the point midway between the fore legs. Cut off the legs at the shoulder and hip, the same as in the large animals, and skin the legs by turning the skin wrong side out as represented in leg No. 2, Fig. 2.

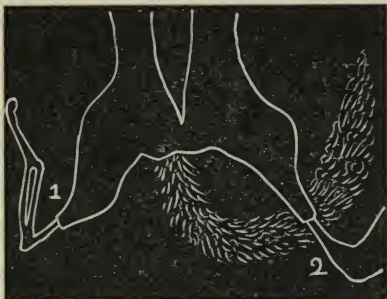


FIG 2.

Showing skin of small animal turned wrong side out,

Cut the tail off at the base; tie to the exposed stump a strong cord, and fasten it to some stationary object and pull steadily and the tail will easily slip off. This method of skinning the tail should only be practiced on such animals as the fox, raccoon, mink, weasel, squirrel, and those still smaller. A great many taxidermists, however, recommend that the tails of the larger ones just mentioned should be slit open, and that the bottom of the foot should be slit open lengthwise, from the base of the middle toe to the heel. The latter operation is certainly a good one for animals from the size of a raccoon and upwards, or those having fleshy feet, but I hardly think it necessary to slit the tail of those under this head.

After the tail is cut off continue to detach the skin down to the fore legs. Skin them in the same manner you did the hind legs, and remember to leave all the bones attached to the skin, and also by their natural ligaments, as seen in No. 1, Fig. 2. Turn the skin wrong side out over the head, cut the ears off close to the head, using great care while skin-

ning over the eyes. Take out the skull entirely and clean it thoroughly, as directed for large animals. The skin, when cleaned, is ready for the "pickle."

TO PREPARE HEADS FOR MOUNTING.

The head of nearly all animals make very desirable ornaments when stuffed and well mounted on shields. Especially is this the case if the animal has beautiful horns. The great trouble is that hunters usually cut the neck off too short. If a deer, it should always be cut off just in front of the shoulders, so that when mounted the taxidermist can give to the neck the graceful curve and shape which is characteristic of the animal in life. Leave the skin longest on the under side of the neck.



FIG. 3.

The dotted lines show where an animal with horns must be slit open on the head in order to properly skin it for mounting.

The necks of animals without horns can be cut off shorter, and it is not necessary to cut the skin at the back of the neck. It can usually be turned wrong side out over

the head. But in all animals that have horns, like deer, antelope, elk, moose and many others, you must follow the dotted lines in Fig. 3.

PRESERVATION OF SKINS.

The best method to preserve a skin after it has been taken from an animal, is as follows: For every gallon of water take one pound and a half of salt and one pound of alum, boil until the salt and alum have dissolved. Put it in an earthen or wooden vessel, and when cool, the skin can be placed in it. This is commonly called by taxidermists "pickle." The liquid should cover the skin and it should be moved and worked about for a while so that the solution can penetrate every part of the skin. Large skins should be moved about in the solution every day for at least five days. Let me impress sportsmen with the fact that the preservation of the skins of animals is of the highest importance.

The animal, when killed, should be skinned at once, and the skin put into "pickle" immediately. In a warm climate you can not be too cautious about this important fact.



CHOICE OF SPORTING DOGS.

The question, which is the best dog—Pointer or Setter—like many other questions connected with field sports, is a difficult one, and will probably never be answered satisfactorily. It is generally conceded that the Pointer is best adapted for dry, warm climates; the Setter for the more cold or northern.

In this short chapter, dogs will be treated only from a practical, common sense standpoint; that is, in speaking of a good dog, has no reference to his breeding or pedigree, nor his value for the stud, but simply his adaptation to the particular use required.

The choice between Pointer and Setter is much a matter of fancy; there are good and bad of both species, and really good ones of either are very scarce; moderately good ones are quite plenty.

The qualifications required for a first-class field dog are, medium in size, well physically developed as to muscle, lungs and feet, good hearing, good eyesight and a keen scent; in a Pointer the coat should be heavy and stiff, but not harsh or of a bristly order; in a Setter the coat should be short and straight, one that lays smooth, the hair on face and head quite short, ears, legs and tails moderately feathered. To judge a dog's disposition by his looks is a very difficult matter. However, dogs with a pleasant, intelligent countenance, mild expressive eyes, will usually be found of a good disposition.

Reject a dog that shows the slightest trace of gun-shyness. Gun-shyness is usually hereditary; a kind of nervousness that is but little understood. Dogs that are gun-shy have the animal propensities strongly developed, and are usually inclined to run about a great deal—become great loafers. Don't waste any time on a naturally gun-shy dog.

sometimes pups that have been frightened by the discharge of a gun, will get over it and make good dogs. Therefore, in selecting a dog, first ascertain to a certainty whether he is gun-shy or not. Care should be exercised in this, as pups are sometimes made so by sudden fright. It is best to select a pup and raise him yourself. See to the feeding in person; have him in your company as much as possible, as it is by associating with man that dogs become intelligent.

However sagacious and intelligent a dog may be by nature, he will only become a ninny if chained up in some back shed by himself. It is much less trouble to raise two dogs than one, as they will be company for one another and less inclined to stray off.

CARE OF DOGS.

Dogs should have all the freedom possible for their proper development. Do not keep them chained up, as it has a tendency to make them crooked in the hind legs, and hump backed. Young dogs require a large amount of food, and should be fed about twice a day; table scrap is good for them and a little raw meat occasionally will do them good. Give them plenty of meat bones, as they are very fond of gnawing old bones. Pups should have plenty of salt in their food as a worm preventative, and there is no worm medicine equal to salt. Dogs whose food is strongly salted at least once a week will generally be free from worms; after they are two years old, once a day is as often as they should be fed, and at night is the best time. Do not be afraid to feed them meat; as a rule cooked meat is best, but they should have occasionally a good feed of raw meat. When they are to be hunted hard, they should be fed plenty; table scrap is good if there is plenty of it. A dog will stand almost any amount of hard work if he is well fed. Give him plenty of meat, and if constipated, plenty of fat meat will remedy it,

for there is no better physic for a dog than a gorge of boiled fat meat. Feeding dogs meat is contrary to the teachings of dog men generally, but if you want your dog to hunt every day in the week give him plenty of good meat in his feed and he will stay with you through thick and thin. During the close season they require but little food if they have their liberty, and will usually pick up more than they should have. This is more the case in cities than in the country, however. Dogs, when not used in the field, are very apt to be overfed and become lazy and fat. Mind you, when they work hard see that they get plenty of good, strong food, and when doing nothing see that they get very little strong food, especially if kept in confinement. If they run at large they will take care of themselves, so far as food is concerned, and ten to one will become worthless loafers.

Dogs should have a clean, warm kennel* to sleep in, and the bedding should be changed often; in the summer time use plenty of flea powder and sprinkle it in the bedding. Carbolic acid is good to kill and keep off fleas; sprinkle the floor of the kennel and bedding with a strong solution of carbolic acid, once a week and your dog will not be troubled with fleas. An excellent wash for dogs is made of carbolic acid one part and water thirty parts; this will keep them clear of fleas, and prevent and even cure almost any kind of skin disease. Fleas are a terrible pest, but with care they can be kept clear of them, and it pays to see carefully to it.

DOG TRAINING.

There are quite a number of good books on dog training. Among the best, "Training vs. Breaking," by Hamond, is by far in the lead. There is but one secret in dog breaking, that is, *prompt and implicit obedience*, that is all there is of it. Dog breaking has no reference to a dog's hunting qualifications; if a dog has not hunting instinct by nature, it will not

pay to waste any time on him. However, it is very rare to find one of the pointer or setter species at fault in this particular. Usually in their eagerness to hunt, they overdo the business; and in this particular they must be controlled if they are to become useful. Therefore, it is of the utmost importance that they are taught obedience at the word of command. This cannot be done in a few short lessons; it will require patience and long perseverance, firmness and decision. All can be accomplished sooner by kindness than in any other way. At times punishment will be necessary, and occasionally quite severe, but never brutal. In such cases, always use a whip; never kick a dog or use a club, but keep control of your own temper and you will soon gain control of your dog. The best whip for the purpose is a common rawhide riding whip, which can be procured at any harness store. The best whip for the field, one that can be carried in the pocket, is a strap of heavy harness leather, eighteen or twenty inches long, cut about one inch wide at the butt end, and tapering to the point. Have the most of the taper in the last half; braid a good, short thread cracker on the point. It is also well to have a good strong string fastened to the butt to hang the whip on the wrist. This makes a much better whip than the worthless things kept by the trade, and at about one-tenth of the cost. In training your dog, first get him to understand what you want him to do, then see that he does it promptly at the word of command. For all his good behavior, praise and caress him; when he does wrong, give him to understand by the tone of your voice, he has displeased you. Dogs are usually very apt scholars and will soon learn by your tone of voice or look whether they are doing right or wrong. If a dog persists in disobeying after he understands what is required, he must be punished severely, but not brutally. All pups are very playful by nature; arrange your training

in the way of play, and you will in time get the very best control of them. Select a young dog that suits you, the younger the better, say four or five weeks old. Commence at once, giving him a short lesson every day ; as soon as he has become reconciled to his new home, have him in your company as much as possible, but do not crowd his education too fast. Teach him one thing at a time. It takes from fifteen to twenty years to educate one of the human species, or one third of the average length of life; do not make the mistake of expecting more of a dog, a mere animal, than of mankind. Be patient, good tempered, and perseverance will accomplish all. Stick to the text, that strict obedience at the word of command, is all there is in dog training.

As soon as you have your dog under reasonable control at home or in the yard, always use the same command for certain actions or duties, then take him to the field; he will hunt from the very start, will also point at sight, but will at the same time have an almost irresistible desire to catch the game if it runs or flushes. Now comes the test of his obedience; if an eager, ambitious dog he will surely make chase, his nature will be stronger than his education; in this case call him back and give him to understand that he has done wrong. In the first lesson, you should not carry a gun, but have a companion who is a good shot and let him do the shooting, and you look after the dog. In case you find game and the pup makes a point, it is quite important, if the bird flushes, to have it shot by your companion; therefore, he should be a good shot.

The dog will soon learn that when he finds and points game that the gun will bring it down if it flushes; that is, he will depend on the gun to get the game. If you have a very ambitious dog it will require time to convince him that he cannot catch a flying bird; your first effort must not be so much to teach him not to run after birds, as it is that it is

not right to do so. As soon as you get him to understand that it is wrong to make chase, then if he persists, you must punish him for disobedience; if he still persists in chasing birds or brakes to shot, you must resort to a check cord. Get a strong cord, twenty-five or thirty feet long; fasten one end to his collar and let him drag it after him in the vicinity of game. As soon as he makes a point, get hold of the cord and give him the word whoa! or any word that suits you, the same word that was used to make him stand in yard breaking. Always use the same word; then if he brakes in, give a severe jerk with the cord; give him to understand, by the tone of your voice, that it is wrong to do so. Do the same if he brakes to shot. A few lessons of this kind will steady him to business. While hunting, if the dog indicates the presence of game by crouching and creeping, let him know that you have observed him by using some particular cautionary word, such as "steady," or "careful;" always use the same words. You will find that it will put him on his guard, and help to steady him very much. If you succeed the first season in teaching your dog just what is required of him, you will have accomplished all or more than you should expect. During the close season, at home, and on all occasions, continue the education of obedience; do not neglect it, for obedience is all there is of it. Nature teaches him to hunt; practice and experience will teach him the habits of game, birds, and the likely place to find them. But the importance of obedience must be taught him by yourself.

If, at the end of the third hunting season, you have succeeded in controlling your own temper, you will certainly have succeeded in controlling your dog. If you really have, you will find that you have a most excellent hunting dog; one that will more than repay you with pleasure for all the trouble that you have been to in training him. You will

also have a better understanding why a really good dog is valued at from three to five hundred dollars.

Retrieving, as a rule, is a natural talent; if you find your dog inclined to retrieve, encourage him in it. In the yard breaking it will be found quite easy to teach him to retrieve a ball, or bunch of rags; always use the same word, such as "fetch," or "bring." If, when you go to the field, you find him inclined to bring a bird by using the word "fetch," encourage him in it; but do not use force. Quite often dogs will take to retrieving themselves, especially if hunted in company with dogs that are good retrievers.

Do not forget that prompt obedience is the all important point, the kind of obedience should be the dogs inclination to please, not through fear of punishment.

If properly managed, as soon as he learns just what you want, he will take great pleasure in obeying. Do not forget it.



1845-1846

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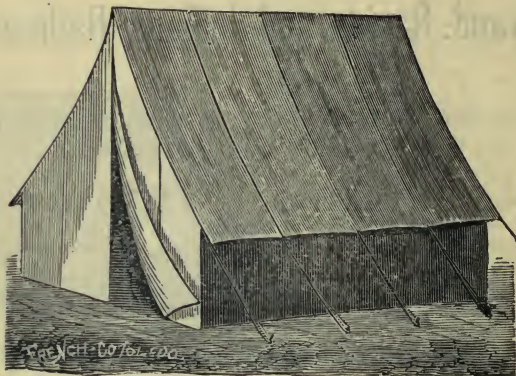
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
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